Vegetation Inventory and Botanical Resource Assessment for the Beaver Creek State Natural Area and Ona Beach State Park Complex of Properties

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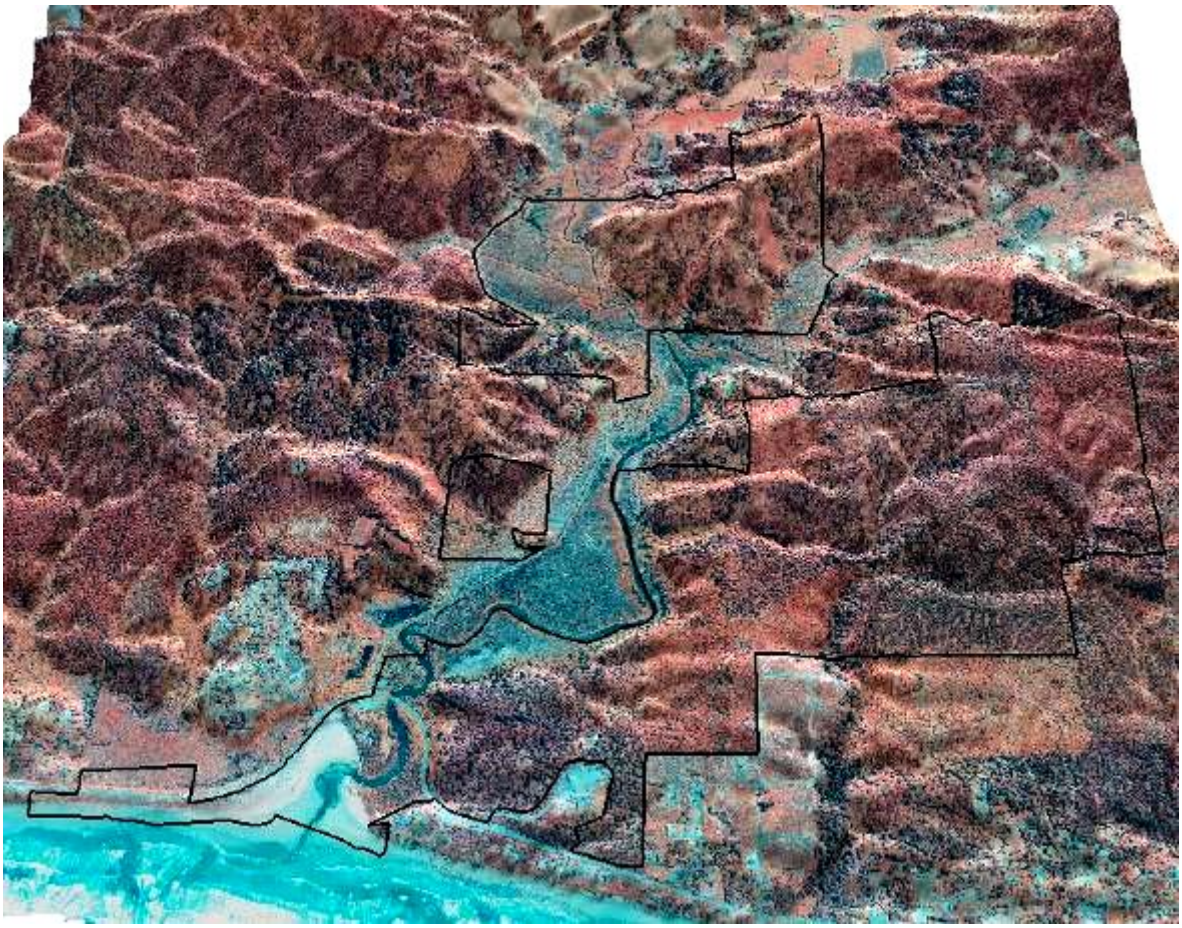

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Introduction

This assessment was done as part of the natural resources background data assessment for use in the development of a Master Plan for the management of the Oregon Parks and Recreation Department (OPRD) properties included within the study area. The study area was assessed for plant communities, wetlands, ecological condition, forest age class, noxious weeds, and state and federally-listed plant species.

Because of the large size and dense vegetation of the study area, a stratified approach to vegetation and ecological characterization was the most efficient means of assessing the area. This stratified approach included detailed, ground-based survey as well as remotely-sensed characterization of the vegetation of the Beaver Creek and Ona Beach Study Area. Areas of detailed survey were characterized by means of ground-based mapping of vegetation features on aerial photographs as the area was meandered on foot. Later remote sensing work used this field-mapped vegetation cover data in addition to approximately 300 ground-based vegetation sampling plots to characterize the vegetation of the entire study area. The selection of detailed mapping areas vs. remotely sensed areas was done according to time of property acquisition: the areas acquired prior to 2010 were surveyed completely, whereas areas acquired thereafter were mapped via remote sensing. This decision was based on the large increase in study area size, the time-intensiveness of a complete ground-based effort, and the logistics and complexities of characterizations of properties for which acquisition negotiations were still underway.

In general, vegetation inventories for the purposes OPRD Master Plans typically involve:

1) Review of published or archived biological data for the site
2) Inventory and mapping of plant associations
3) Identification and mapping of significant habitat
4) Identification and mapping of any rare plant or animal species known or found
5) Assessment of condition, successional status, and conservation ranking of plant communities present at the site.
6) Identification and mapping of significant infestations of invasive species.
7) Identification and mapping of wetlands and water-features

In the case of this particular study area, significant natural habitats are present in many areas. Although invasive plant species are widespread and abundant, much of the landscape retains a natural character and provides valuable wildlife habitat. Marshland and late seral forest are prominent and highly significant. Mature conifer and hardwood swamps and scrub-shrub wetlands are notable as well.

No plant species listed under the Federal Endangered Species Act are known from the property. A state listed threatened plant species, pink sandverbena (*Abronia umbellata ssp. breviflora*) has been reported from Ona beach in the past.

Past Work and Existing Data

Several sources of information were checked for existing data and inventory for the Beaver Creek and Ona beach properties and their immediate vicinity. These included OPRD files, the Oregon Biodiversity Information Center (ORBIC), Interagency Mapping and Assessment Project (IMAP) data, LANDFIRE data, and Wetlands Conservancy data.

The ORBIC database revealed one specific known sites of a protected plant species within the primary study area. Additionally, several at-risk plant species were reported within a short distance of the boundary of the study area, and from within the park property as a whole. These species occurrence are described in more detail in the section of the report titled ”At-Risk Plant Species and Habitat”.

The plant species present in the marsh vegetation of the Wetlands Conservancy property were listed by an unknown botanist. This list given to OPRD by a neighbor.

Description of the Beaver Creek/ Ona Beach Study Area

The property assessed in this report, referred to hereafter as the “study area”, includes the entirety of Beaver Creek State Natural Area and Ona Beach State Park, in addition to several recent property acquisitions in the vicinity that have not (at the time of this writing) been formally allocated to either of these named properties. The study area complex is located along Beaver Creek in Lincoln County, Oregon and includes several contiguous and disjunct areas of land from the mouth of the creek at Ona Beach, inland approximately 2.5 miles. The study area covers approximately 1283 acres of land and water. The legal location of the property is Township 12S, Range 11W, Sections 18,19,20,21,29, and 30. See Vicinity Map, Figure 1 for more detailed location information.

Topographically speaking, the study area is centered on a low and relatively flat estuary and floodplain bottomlands flanked by hilly/low-mountainous uplands of ridge and canyon systems. Some areas of the uplands are on old marine terraces, and are relatively flat. The study area has significant topographic variation. Elevation within the study area ranges from sea level to 370 feet above sea level.

The study area’s vegetation is a combination of forested areas, emergent wetlands, woodlands, scrub-shrub wetlands, shrublands, reed canarygrass meadows, non-native grasslands, and submerged and aquatic plant communities. Forest habitat types are varied in both age and species composition. Major forest types present in the study area include second growth conifer forest, alder-dominated second growth hardwood forest, later seral conifer forest, and shore pine-Sitka spruce littoral forest. Wetland habitats are diverse and include hooker willow swamps, tule marshes, sedge marshes, and tufted hairgrass marshes. Degraded marshlands are commonly infested with reed canarygrass and/or colonial bentgrass. Upland grasslands are almost completely non-native in species composition.

The study area includes many artificial features. These features include housing and buildings, roads, parking areas, a boat ramp, mowed lawn areas, pastures, recently logged areas, logging landings, and a trail system.

Figure 1. Beaver Creek/ Ona Beach Study Area Vicinity Map

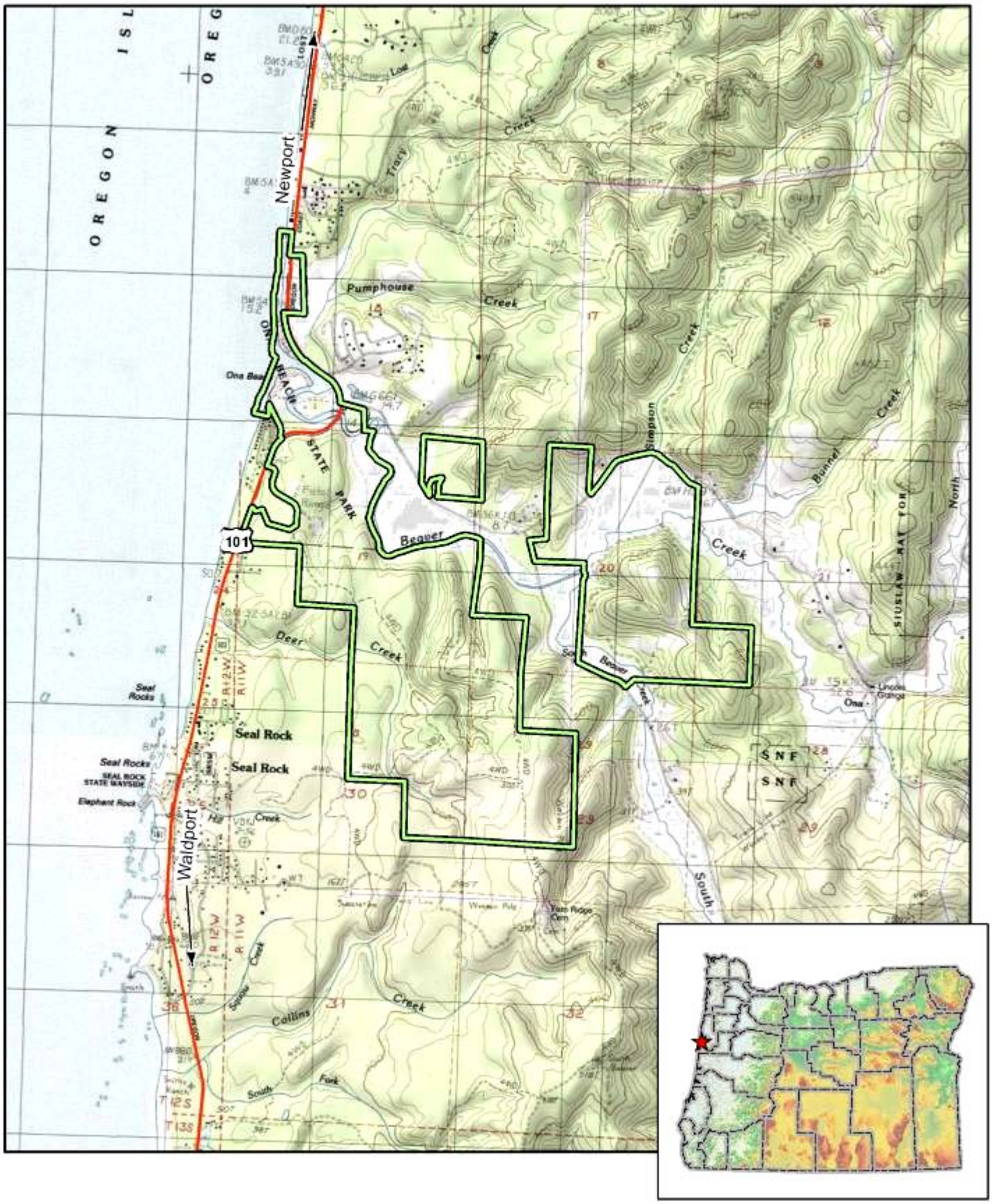
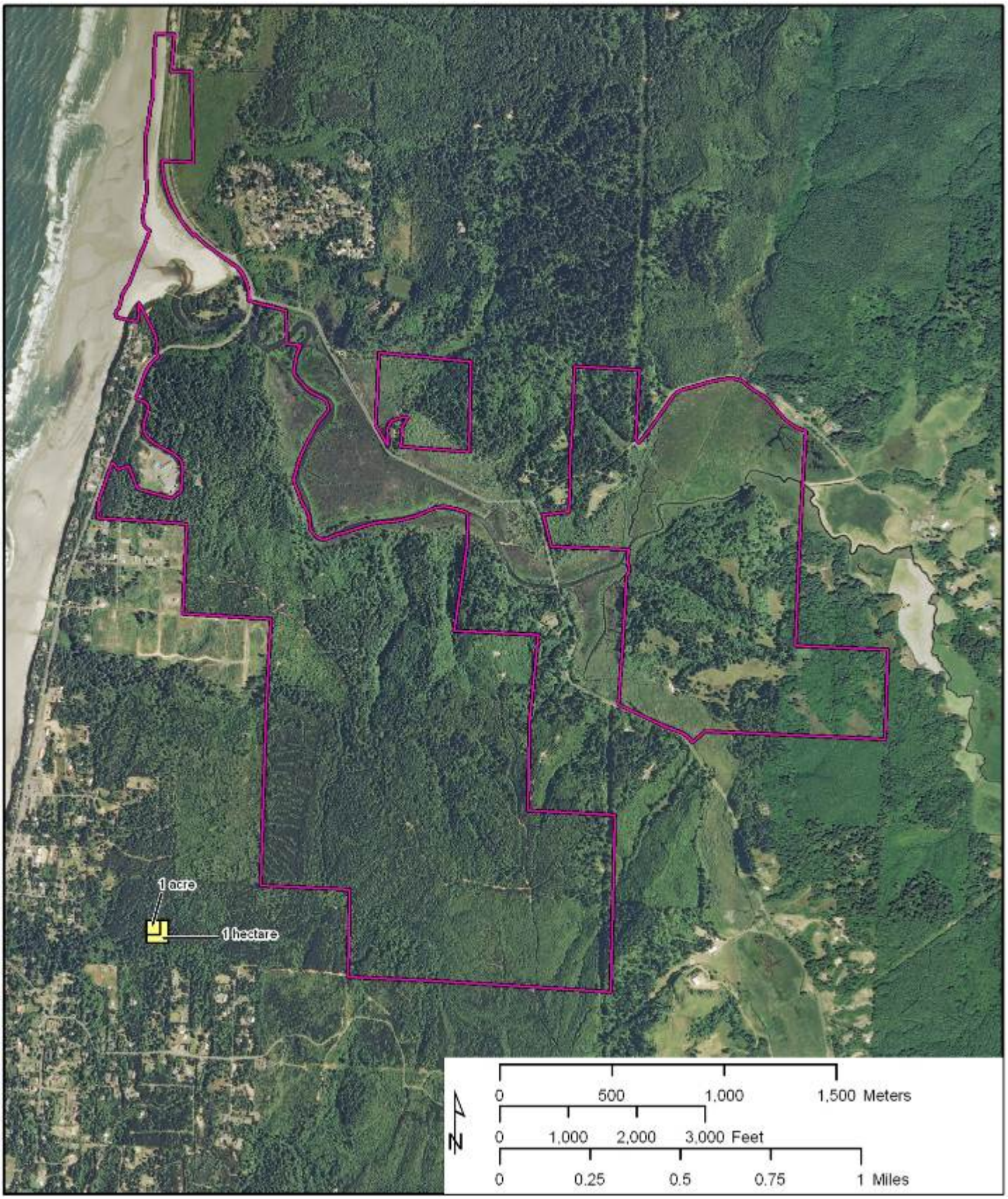


Figure 2. 2011 Aerial Photography of the Park Properties



Historic Vegetation and Change

Historic and prehistoric vegetation cover can be inferred from a variety of sources - including early surveyors' notes, soil types, slope, aspect, elevation, known fire history, known fire return intervals, and other environmental parameters. Several large-scale habitat modeling efforts have assessed environmental parameters in conjunction with early vegetation accounts to characterize pre-settlement vegetation. In the case of the current study area, five sources of historic information or modeling are available:

- General Land Office surveyors' notes from 1874-1882.
- an Oregon Biodiversity Information Center (ORBIC) interpretation of historic vegetation based on early surveyors' notes
- the IMAP Potential Natural Vegetation model
- the US Forest Service LANDFIRE Biophysical Settings model
- USFS Potential Natural Vegetation models
- typical natural vegetation associations reported in the Natural Resources Conservation Service's NASIS soils data

These sources effectively indicate a general picture of the site's past vegetation cover, although each source varies somewhat from the others. This general, composite picture provides a starting point for analysis of change in vegetation over time, which can be roughly deduced by comparing present vegetation to the presumed past vegetation, and especially by taking into consideration known and presumed post European-American settlement land management events and practices.

The broad vegetation types presumed to be present on much of the site prior to and soon after European-American settlement are reported in all sources as historically dominated by forest, beach, and wetland/marshland/swamp. Forest types were assumed to be of three general types – red alder seral forest, Sitka spruce-shore pine forest, and Sitka spruce-douglas fir-western hemlock-western redcedar forest. Marshland/swamp reported in the ORBIC model is not specific as to species composition. None of the previously available models field-checked the data accuracy at the Beaver Creek Ona Beach site itself, and all obviously under-represent the historic diversity of the study area due to the inevitability of missing smaller inclusions of habitats (such as shrubland and grassy balds) given the scale at which they were operating.

The ORBIC data provides the best and most easily applied existing approximation of pre-European-American-settlement vegetation patterns across the study area. This data is presented in Figure 3.

Overall pre-Euroamerican-settlement patterns of vegetation and presumed anthropogenic change are best broken out and further described in four zones that elaborate on the historic vegetation model: marshlands, spruce-cedar swamps, upland conifer forests, grasslands, littoral strand, and hardwood forest.

Hardwood forest

These forests were likely composed primarily of red alder, Scouler willow, pacific crabapple, and cascara. There would also likely have been scattered conifers in these forest types along with a variety of tall shrubs such as salal, salmonberry, vinemaple, and red elderberry. These forest types are largely the same in terms of species composition now as they likely were in the 1850's, with the exception of the scattered patches and areas of non-native dominant species such as himalaya blackberry and reed canarygrass. Prehistoric examples of hardwood forest within the study area would have been both relatively stable in composition as well as transient communities arising from disturbances such as wildfires, landslides, storm blowdown, etc. Areas that were not short-term transitional stages toward conifer forest would have been those that were frequently subjected to disturbance due to erosion and fluvial processes. It is likely that hardwood forest habitat type has expanded significantly since 1850 because of clearcut logging practices, which often result in dense stands of recruited red alder after removal of the previous conifer overstory.

Marshlands and wet meadow habitat

Marsh and aquatic habitats of the study area have changed significantly in the period of European-American settlement due primarily to the influences of anthropogenic hydrological alterations, past agricultural uses, and the introduction of non-native invasive plant species.

Hydrological alterations within the study area take several forms. Several drainage channels and dikes have been constructed in the lowlands of the study area in the last 150 years, presumably to make more of the property suitable for agriculture. These features were probably more effective in the past than they area now, due to discontinuation of maintenance. Major roads have been constructed on elevated causeways through the wetlands, which act much like dams. Culverts provide water passage through the causeways, but alterations of drainage patterns are evident – especially when culverts become plugged. At least one older railway trestle is evident in the study area, and may have had similar effects on hydrology as do the causeways. Additionally, the mouth of Beaver Creek is subject to natural cycles of sand and debris obstruction. This obstruction naturally leads to periodic changes in hydrology within the marshes that have pronounced effects on vegetation composition. Oral history indicates that this cycle of hydrology was interrupted during a period of agricultural use in which upstream landowners breached the obstructions to allow more efficient drainage. This breaching has probably altered vegetation composition relative to pre-agricultural conditions.

It is possible that past Native American management was a factor in the vegetation composition of the wetland and prairie here, but little written information is available. Presumably, the wetlands were once managed for the production of culturally important plants. Prescribed burning and other direct manipulation of vegetation may have maintained herbaceous wetland and prairie types, and kept them from transitioning into forested or shrubland habitats.

There is some evidence that there may have been some sphagnum peat mining in a portion of the marshland north of beaver creek road in an area near the old railroad trestle during the World War I era. If this is true, this indicates a large shift in vegetation composition. No sphagnum peatlands are known from the lower marsh today.

Non-native plants - including reed canarygrass, colonial bentgrass, and yellow flag iris - are significant invaders in much of the wetland and riparian habitat in the study area.

Spruce and Cedar Swamps

Spruce and cedar swamps are characterized by wet, mucky soils and an understory of predominantly wetland species such as skunk cabbage, slough sedge, water parsley. There may be hummocks with mesic species such as salal, salmonberry, etc. These communities are still present within the study area, but appear to have been replaced by red alder forest in some places with evident logging history. A large area of this habitat was partially killed off during the 1996 flood event. Possibly due to artificially elevated water levels through much of the growing season because of a plugged culvert under Beaver Creek Road.

The examples left of this community tend to be associated with the bottoms of draws and in the transition zone between marshland and forest.

Upland Conifer Forest

The majority of the upland forest in the study area has an overstory of mixed Sitka spruce, douglas-fir, western hemlock, and western redcedar. Some areas, particularly on old marine terraces and in sandy soils, have a substantial or even dominant shore pine component. Some stands are older than others, and there is a variety of degrees of colonization by non-native plant species and early seral species such as red alder and cascara. Scattered stands of late-seral habitat remain, but large portions of this habitat type in the study area are second or third growth. There are many young forest plantations within this type.

Abnormal species stocking and health are evident within many of the younger examples of this habitat type in the study area. Some of these areas have been planted with artificial densities of douglas-fir and shore pine. In many of the younger douglas-fir plantations the endemic disease “Swiss needle cast” is rampant, presumably due to off-site genetic planting stock that is more susceptible to the local suite of Swiss needle cast phenotypes.

Large areas of the upland conifer portions of the study area have historically and prehistorically been covered by old-growth forest. Records from the 1870’s and 1880’s indicate that at that time a large portion of the study area was recently burned, while another portion was late seral. The landscape would have been continuously subject to catastrophic forest loss and replacement over the millennia – and from this perspective, the distribution of forest age-classes on the landscape might not be out of the realm of “normal conditions on the site”. However, the forest age distribution across the study area is almost definitely skewed toward the younger end of the range expected under a natural disturbance regime because of logging; and, the spatial distribution of age-classes is probably significantly more fragmented than it would be without logging.

Logging has introduced weeds in many areas of younger plantations, and roads and landings also substantially impact the ecology of the forest.

Grasslands

There are more upland grasslands on the landscape now than there were prior to European American settlement due to conversion of forest to cattle pasture. These grasslands are overwhelmingly non-native in species composition. The grasses present are mostly cultivated forage grasses that were undoubtedly seeded into cleared areas as part of the conversion of forest to pasture. These grasslands have been actively maintained against tree and shrub encroachment by farmers, and all would naturally be recolonized by woody vegetation if left unmaintained. These openings in the forest are colonized by a number of invasive plant species such as himalaya blackberry, scotch broom, thistles, and tansy ragwort. These species burgeon with discontinuation of grazing, mowing, and maintenance.

If native grasslands were present on some of the hilltops (grassy balds) or slopes, little or no evidence remains of their presence.

Native grassland is presently known only in wet areas along Beaver Creek. These wet grasslands are part of the marshland system, and are characterized by the presence and abundance of tufted hairgrass, along with a variety of other sedges and rushes. Whether these wet grasslands have increased of decreased in size relative to pre-agricultural conditions is not known.

Littoral Strand

The littoral strand occurs at the edge of the ocean and includes beach, dunes, and wind and salt pruned woody vegetation. This area has changed radically in the last 100 years as a result of the introduction of European beachgrass. This grass has dramatically changed dune and shore morphology in addition to plant community composition. Because European beachgrass is such an effective binder of sand, it has caused the formation of higher dunes. As these dunes become higher, drier, and increasingly stabilized by the grass, they are increasingly colonized by trees and shrubs – which leads to transition from low, sparsely vegetated sand to shrubland and forest. Much of the stabilized sand along the littoral strand has been colonized by wind and salt pruned shrubs and trees. These woody habitats are often dense and gnarled. It is likely that these woody littoral habitats have become more abundant in the last 100 years relative to prehistoric conditions.

Pristine vs. Modified or Degraded Areas

Some of the forest environments are essentially pristine, with no obvious signs of Euro-American influence, particularly in the late seral conifer forest and the wettest marshland habitat types. These are of high conservation significance. Other areas are in various levels of modification or disturbance. Where ecological condition is good, conservation significance tends to be high. See the Botanical Resource Value map and the conservation rankings associated with the plant community descriptions for more information.

Historic Vegetation Modeling

The present study's data and analysis made it possible to model prehistoric vegetation based on a subset of the plots used to characterize the existing vegetation of the study area. This prehistoric vegetation model uses only the plots that are in good to excellent condition and coniferous forest plots that are late seral. Hardwood dominated plots were used if they occurred in area of

expected frequent disturbance and high hydrology. The results of this modeling exercise are presented in Figure 4. While probably not exceedingly accurate, the model appears to be useful in determining potential restoration targets – particularly with regard to which species appear to have a niche in a particular environment based on physiography.

Figure 3. Vegetation Prior to European-American Modification

From ORBIC assessment based on General Land Office survey notes from the mid to late 1800's

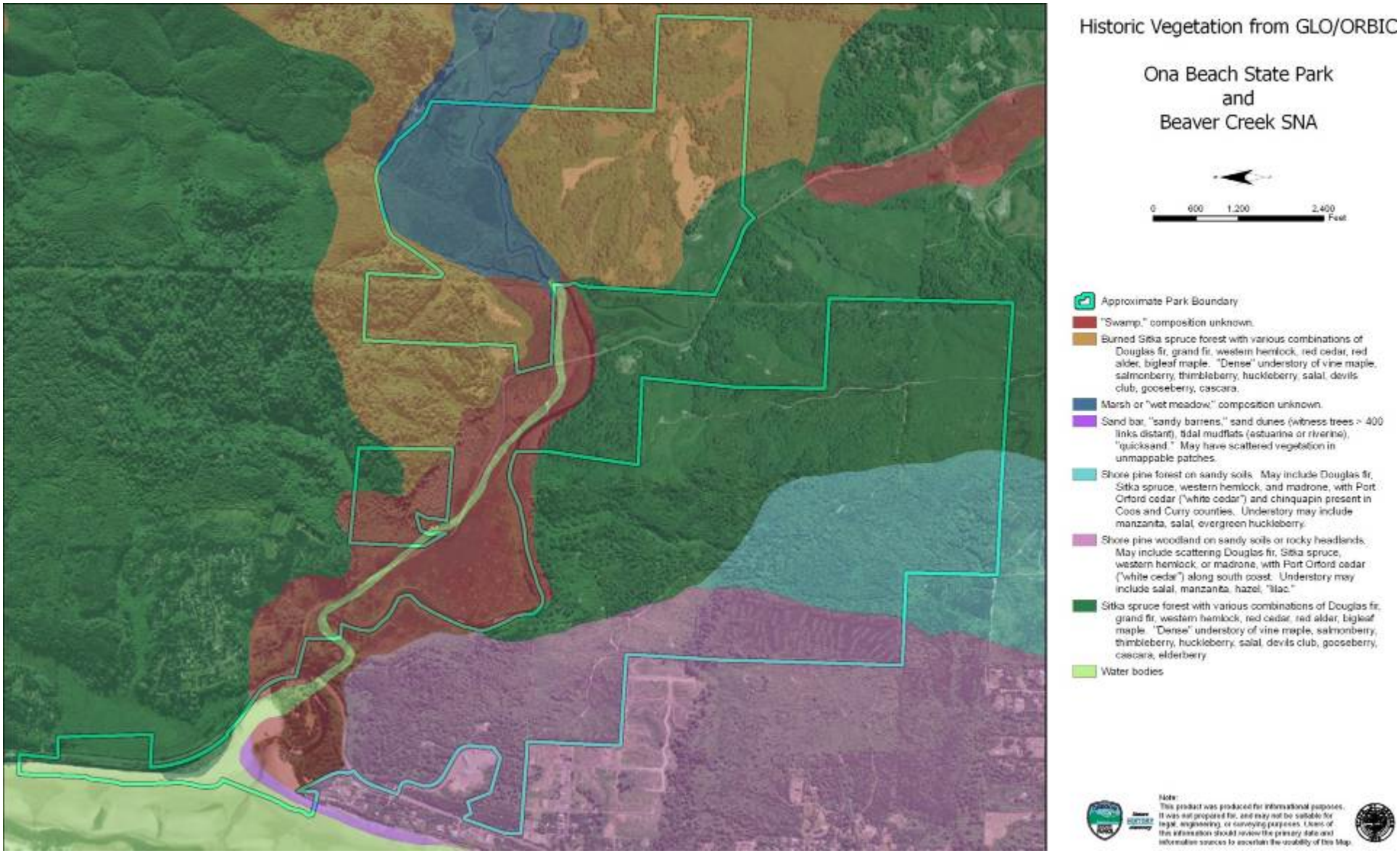


Figure 4. Empirical Prehistoric Vegetation Model based on Reconnaissance Plot Data

(Note: the codes given in the legend denote communities of plant species where the plants are represented by a concatenation of the first 3 letters of both genus and species in the scientific name)

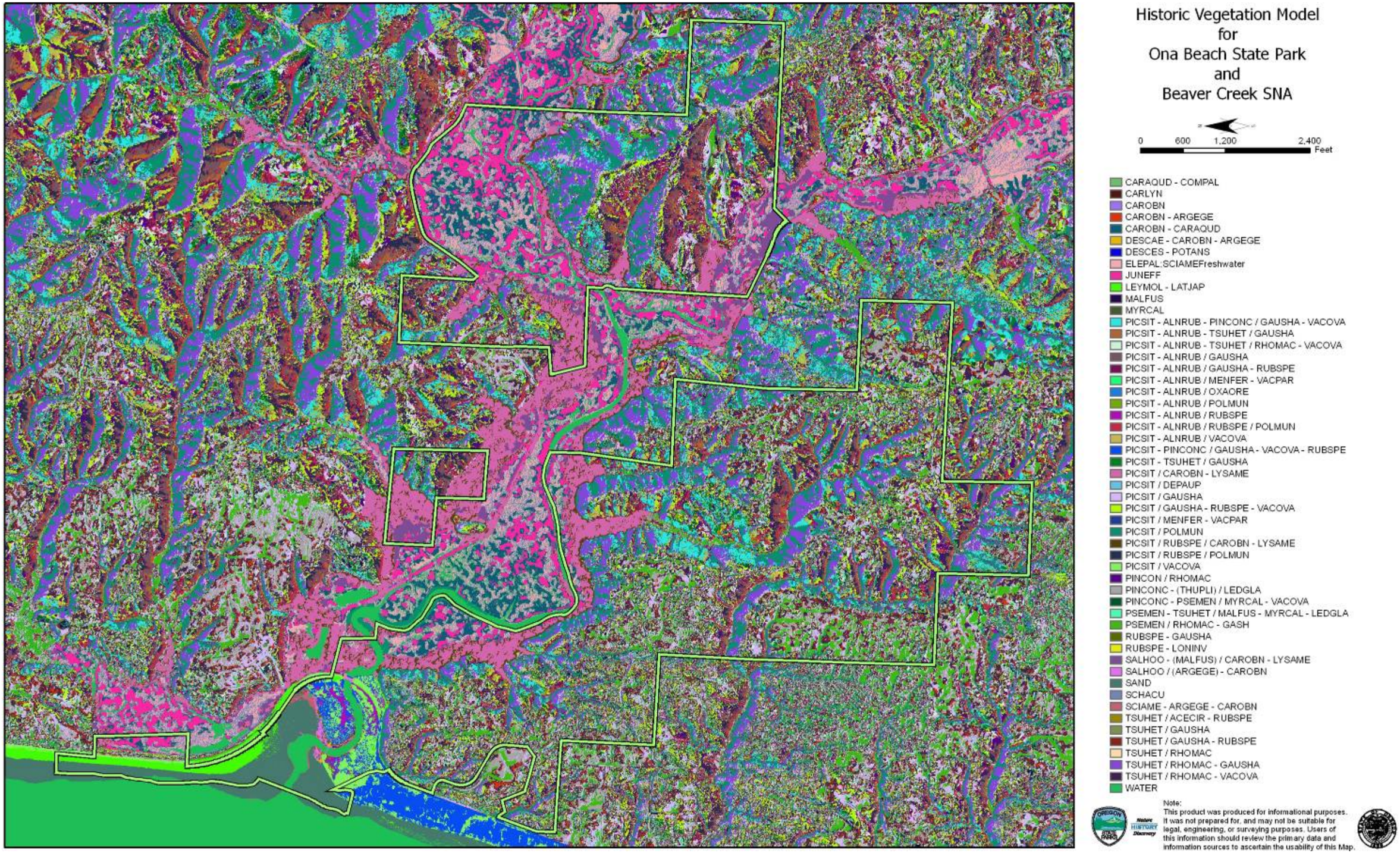


Figure 5. Soils

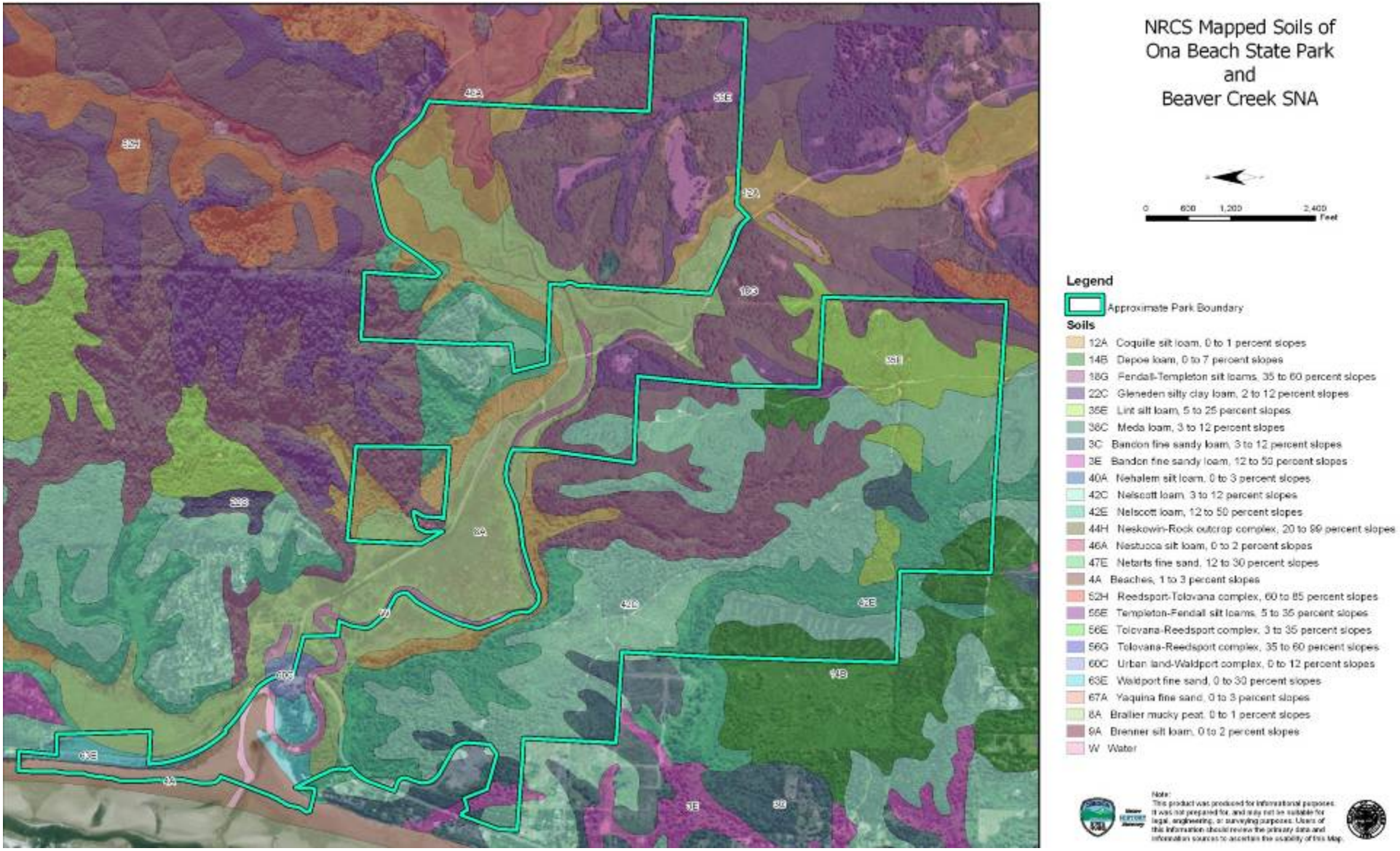


Figure 6. Forest Age/Canopy Height

Methods

Plant community mapping and description was completed using a multi-phase process. The scope of the inventory changed over the time period between project inception and completion due to increasing acreage of the study area. The first and second phases of the inventory relate to a small portion of the study area. This portion of the inventory was done at a high level of on-the-ground detail. On-the-ground, detailed mapping was started in 2008 on the property acquired from Keaty. Later, the property acquired from Price was added to the project, which was likewise mapped through on-the-ground reconnaissance. In 2011 the rest of the study area was added to the project. Of the portion added in 2011, only the vegetation of the Ona Beach State Park property surrounding the existing facilities was mapped onto aerial photographs in the field. The remainder was partially sampled using ground-truthing plots and remote sensing.

The property acquired from Keaty was field-mapped by Noel Bacheller in 2008. Katie Duzik field-mapped the Price property in 2009. Noel Bacheller field-mapped selected portions of Ona Beach in 2011. Vegetation reconnaissance plots for use in remote sensing were sampled by both Noel Bacheller and Katie Duzik in 2011.

Detailed ground-based polygon mapping:
For portions of the study area mapped in detail via on-the-ground reconnaissance, the process was two-phased. The first phase was done in the office and consisted of collection of available information on the area and its botanical environment, followed by a delineation of rough plant community boundaries on aerial photographs. The second phase consisted of ground truthing, amending, and refining these boundaries in the field while collecting plant community composition data and surveying for at-risk plant species and weeds. Field work was done in 2008, 2009, and 2011. Field data collection was conducted at a higher resolution than is generally useful or desirable for master planning, but that is useful in natural resource management planning. Data was described in sufficient detail to allow for later consolidation of similar polygons into the lower resolution polygons needed for master planning. The more detailed resolution mapping is included in Appendix 3. The field data collection process involved 1) delineating and describing all distinct plant communities that were discernible on the aerial photographs; and 2) approximately delineating all plant communities that were feasibly mapped in the field on aerial photographs, elevation models, or hydrography, but whose edges were not clearly visible on the aerials.

Plot-based sampling for use in remote sensing:
For portions of the study area sampled and analyzed by means of remote sensing methods, the approach was multi-phased:

The first phase consisted of selection of sampling plots from aerial photographs and topographic data. Plots were selected so as to have redundant examples of aerially identifiable vegetation types/changes in a variety of topographic positions. These plot selections were made subjectively by best professional judgment in an effort to have field data for multiple examples of every distinguishable vegetation type present in the study area.

The second phase consisted of field data collection for each of these sampling points, along with collection of data for additional points where vegetation changes experienced on the ground appeared to demonstrate a significant niche or transition. The data collected were species composition for the relevé plot in community notation. Data for wetland vs. upland, ecological condition, tree size, seral stage, and general comments were also collected. Part of this field data collection phase was the collection of individual species calibration samples – individual trees, shrubs, and herb patches were identified to species and recorded on aerial photos or by GPS. These sample points were collected in an attempt to create a catalogue of verified species points used to train the remote sensing process to recognize differences between species of trees, shrubs, and herbs by their aerial photograph spectral signatures.

The following two phases describe the GIS-based remote sensing process. An overall workflow and detailed models of the processes involved are depicted in Figures 7-16.

The third phase was a first-pass supervised classification of aerially identifiable cover based on species training samples and topographic/LiDAR derivatives. This process is detailed in Figures 12 and 13. The result of this portion of the process is a map of aerially identifiable vegetation cover without regard to understory composition or species mixtures. For example, this portion of the model identfies areas of Sitka spruce forest, but does not attempt to apply plant community training plot data to characterize understory composition in that forest. This 1st pass classification breaks the study area into zones or image "segments" that are fairly easily checked for accuracy and which reduce the complexity of the raster base that is used in subsequent plant community/understory classification phases. This reduces classification-space dimensionality, reduces CPU processing time, decreases noise in the data, and increases accuracy in second-pass supervised classifcation. In essence, it serves to reduce the number of independent variables that the second-pass model has to consider for each pixel in the output raster, and arranges potential outcomes into "clusters" based on aerially identifiable cover type. Use of these clusters prevents mismatching of classification outcomes and aerially-evident cover types. For example, if the pixel being classified has already been determined to belong to a douglas-fir forest type by the first pass classification, the second-pass classification will not put emergent marsh and grassland types on the same footing as the douglas-fir types when making a decision as to which community is the best match in terms of ecological parameters.

> *A simplified scenario demonstrating the value of segmenting the aerial imagery before using the data in subsequent second-pass classification:*
> Consider a spruce community with aerial photograph red band value "r", green band value "g", blue band value "b", near infrared value "n", height characteristic "x", and topographic position "y". Other examples of the same community might have slightly different values for each of these parameters, but they would generally be in the same "neighborhood "of values. In some cases, other plant community training samples might match the values of the pixel in question just as well as or better than the true classification in terms of the non-herarchically-clustered, raw difference in actual value vs training sample value from the signature profile. So, a pixel that is spruce community in reality might have a signature profile of $\vec{A}$=[r, g, b, n, x-2,y+3] for the raster bands at that pixel's same location. The correct classification training sample might have a signature vector of $\vec{S}$= [r,g,b,n,x,y]. A red alder community might have a signature of $\vec{R}$=[r-1, g-1,

b, n, x,y]. The distance between the three vectors can be computed in a 6-dimensional Euclidean classification space as follows:

Distance(A,R) = $\sqrt{(r-(r-1))^2+(g-(g-1))^2+(b-b)^2+(n-n)^2+(x-x)^2+(y-y)^2}$

$= \sqrt{2} = 1.4$

Distance(A,S) = $\sqrt{(r-r)^2+(g-g)^2+(b-b)^2+(n-n)^2+(x-(x-2))^2+(y-(y-3))^2}$
$= \sqrt{13} = 3.6$

As can be seen in the computation of distance above, the vector for the red alder community is numerically closer to that of the pixel than is the vector for the true community. This difference creates enormous error. If the RGB and near infrared values were first considered separately to arrive at overstory cover, however, and this first pass gave value of "S" for spruce and "R" for alder, the vectors being compared in the second-pass nearest neighbor classification would be less error prone:

True identity vector (spruce community): $\vec{S}$=[C, x, y]

Alder community from before: $\vec{R}$=[D, x, y]

Pixel value in question: $\vec{A}$=[C, x-2, y+3]

Where the values C and D are weighted so as never to allow these clusters to overlap in the classification space – i.e., with hugely disparate values like C=10,000 and D= 20,000

Distance(A,R) = $\sqrt{(10{,}000-20{,}000)^2+(x-x)^2+(y-y)^2}$
$= \sqrt{100{,}000{,}000} = 10{,}000$

Distance(A,S) = $\sqrt{(10{,}000-10{,}000)^2+(x-(x-2))^2+(y-(y-3))^2}$
$= \sqrt{13} = 3.6$

The fourth phase was a second-pass supervised classification using the results of the first pass classification as one of the base data rasters. The result of this classification is a matching of pixels across the study area to the most similar reconnaissance plot in terms of the input raster values. This methodology is similar to Gradient Nearest Neighbor (GNN) imputation (Ohmann and Gregory, 2002). The principal difference between the method used in this assessment and GNN is in the weighting of environmental variables. Whereas in GNN parameter weighting is done by means of canonical correspondence analysis (a statistical operation), the Beaver Creek study relied on professional judgment and subjective weighting of variables. For example, some variables were measured on a smaller scale such as 1 to 100, whereas other variables were spread out over larger ranges, like 0-65,000. The effect of this modification of scale serves to make some variables more important than others in determining distance from the pixel to the nearest plot in gradient space. It also serves to "cluster" the training plots, so that cover types cannot be mismatched with key parameters (see discussion under step three above). This was particularly true of categorized data (as opposed to continuous data). For example, some variables were

binary masks such as marshland, clearcuts, and the littoral zone. In these cases, the goal was for only plots and pixels inside a particular mask to be allowed to correspond. These binary masks were set to the values of 0 and 65000. This effectively made the gradient-space Euclidean distance between any pixel inside the mask several orders of magnitude closer to those reconnaissance plots inside the mask than those outside of it, and also made pixels outside of the mask incredibly far away. Where the goal was to allow pixels and plots to associate more loosely, a scale of 1 to 100 or 1 to 10 effectively decreases the Euclidean distance in gradient space. Using canonical correspondence analysis could conceivable improve the results, but the subjective weighting seemed effective and less cumbersome – although many iterations of the process with modifications to scaling/weighting were necessary to arrive at results that met expectations.

Data consolidation and attribution:
Land cover data from both field-mapped and remotely-sensed sources was merged into a raster GIS feature class and attributed using the following OPRD criteria:

1. OPRD mapping code for each plant association and land cover polygon. The OPRD mapping code is a concatenation of cover type, a sequential number, age class (for forested types), and condition class. See items 7, 8, and 10, below for more information on these components.
2. Scientific name for each native plant association, using ORBIC/NatureServe format;
3. Common name for each native plant association, and each non-native plant community or other land cover classification;
4. ORBIC/NatureServe format acronym for each native plant association;
5. Equivalent or closest plant associations in the published literature.
6. NVCS alliance;
7. Habitat type for each native plant association, using ORBIC classifications; Abbreviated as “F”=forest, “S”=shrubland, “W”=woodland, “H”=herb/forb-land, “A”=agriculture, “V”=developed, “D”=disturbed.
8. Age class code for each forest association polygon: A = old, B = mature, C = mid-aged, D = young;
9. Conservation rank. This code is ascribed to a plant community based on the ORBIC “Classification of Native Vegetation of Oregon”. Where plant communities are represented exactly in the Classification, the conservation rank code is copied directly. Where a plant community is similar but not completely equal to a community in the Classification, it is preceded by a “~”. When a community is not represented at all in the Classification, but is deemed somewhat rare, it is given a rank based on best professional judgment. These cases are identifiable in the data by text format, being “~S?”, where “?” will be a particular number depending on the polygon. Note that they do not have the “G?” portion of the code that those communities that are represented in the Classification have. The numbers (1 through 5) following either G or S in the code represent conservation status of each native association, based on ORBIC ranking criteria. The number “1” represents types that are endangered throughout their range, and “5” represents types that are demonstrably secure. A description of how this ranking system works is included online at: http://www.natureserve.org/explorer/ranking.htm.

10. OPRD condition rating representing the condition of each plant association delineated as a discreet polygon will be rated using the codes below:
    - *Condition "e" (excellent)*: Pristine or near pristine native plant community. Exotic plants typically have a significant presence in the species composition over less than 10 percent of the polygon.
    - *Condition "g" (good)*: Native plant community generally of good vigor and condition. Exotic plants typically have a significant presence in the species composition over 10 to 30 percent of the polygon. Condition may be downgraded by factors other than invasive species presence – i.e. trampling, fire, wind throw, erosion, etc.
    - *Condition "m" (marginal)*: Native plant community substantially degraded by intrusion of exotic plants or human disturbance. Exotic plants typically have a significant presence in the species composition over 30 to 70 percent of the polygon. Condition may also be downgraded by factors other than invasive species presence – i.e. trampling, fire, wind throw, erosion, etc.
    - *Condition "p" (poor)*: Native plant community highly degraded or replaced by exotic plants. Exotic plants typically have a significant presence in the species composition over more than 70 percent of the polygon**.** Condition may be downgraded by factors other than invasive species presence – i.e. trampling, fire, wind throw, erosion, etc.
11. Wetland polygon indicator, representing wetland plant association types and other surface water features (yes/no/possibly/partially field). The "possibly" value is used in cases where formal determination plots would be necessary to accurately indicate whether the polygon is wetland or not. The "partially" value is used in cases where a polygon contains wetland and non-wetland areas that are not mappable without formal wetland delineation plots and methodology.
12. Botanical Resource Value rating. Plant community Resource Value ratings will be used to determine the appropriate locations for development, conservation, or restoration in the park, along with ratings of other factors including known occurrences of sensitive species, habitat, hazards, and cultural resources.

    Ratings are numeric and range from 1 to 4, based on the matrices that follow:

For Non-Forested Habitats

	Condition E	Condition G	Condition M	Condition P
Special designation*	1	1	1	1
Occupied listed plant species habitat	1	1	1	1
High probability inconclusively surveyed listed species habitat	2	2	2	2
Other at-risk plant species occupied or high probability habitat	2	2	2	2
Priority Habitats[A]	2	2	**Restoration Feasibility[B]** / **Resource Value** High / 3(2) Med / 3(2) Low / 3	**Restoration Feasibility[B]** / **Resource Value** High / 3(2) Med / 3(2) Low / 3
Conservation rank S1	2	2	**Restoration Feasibility[B]** / **Resource Value** High / 2 Med / 2 Low / 3(2)	**Restoration Feasibility[B]** / **Resource Value** High / 3(2) Med / 3(2) Low / 3
Conservation rank S2	2	2	**Restoration Feasibility[B]** / **Resource Value** High / 2 Med / 3(2) Low / 3	**Restoration Feasibility[B]** / **Resource Value** High / 3(2) Med / 3 Low / 3
Conservation rank S3	2	2	**Restoration Feasibility[B]** / **Resource Value** High / 3(2) Med / 3(2) Low / 3	**Restoration Feasibility[B]** / **Resource Value** High / 3(2) Med / 3(2) Low / 3
Conservation rank NA or >S3	2	3	4	4
Developed or agricultural	4	4	4	4
Definite wetlands	2	2	2	2
Possible wetlands	2 if <=S3 3 if >S3	2 if <=S3 3 if >S3	3	3

<u>For Forested Habitats</u> (including woodlands)

	Relative value index	Condition E	Condition G	Condition M	Condition P
Special designation*	10	1	1	1	1
Occupied listed plant species habitat	10	1	1	1	1
High probability listed species habitat	9	2	2	2	2
Other at-risk plant species populations or habitat with high probability of presence or necessary future dispersal	8	2	2	2	2
Priority Habitats[A]	8	2	2	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 2 3(2) 3(2) moderate 2 2 3(2) 3(2) low 2 3(2) 3 3	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 2 3(2 3(2) moderate 2 3 3(2 3 low 3 3 3 3
Conservation rank S1	7	2 if age class A,B,C 3(2) if age class D	2 if age class A,B,C 3(2) if age class D	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 2 3(2) 3(2) moderate 2 2 3(2) 3(2) low 2 3(2) 3 3	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 2 3(2) 3(2) moderate 2 2 3(2) 3(2) low 2 3 3 3
Conservation rank S2	6	2 if age A,B,C 3(2) if age D	2 if age A,B,C 3(2) if age D	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 2 3(2) 3(2) moderate 2 2 3(2) 3(2) low 2 2 3 3	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 3(2) 3(2) 3(2) moderate 2 3(2) 3(2) 3(2) low 2 3 3 3
Conservation rank S3	5	2 if age A,B 3(2) if age C,D	2 if age A,B 3(2) if age C, 3 if Age D	**Restoration Feasibilty[B]** / **Age Class A B C D** high 2 3(2) 3(2) 3(2) moderate 2 3(2) 3(2) 3(2) low 2 3(2) 3 3	**Restoration Feasibilty[B]** / **Age Class A B C D** high 3(2) 3(2) 3 3 moderate 3(2) 3(2) 3 3 low 3 3 3 3
Natural or semi-natural Communities with Conservation rank NA or >S3	4	2 if age A,B 3 if age C,D	2 if age A 3 if age B,C,D	3 if age A,B,C Otherwise 4	3 if age A,B Otherwise 4
Definite wetlands	8	2	2	2	2
Possible wetlands	7	2 if <=S3 3(2) if >S3	2 if <=S3 3(2) if >S3	3(2)	3(2)
Developed or artificial	1	4	4	4	4

** for the purposes of this matrix, "special designation" means that the polygon is part of a conservation area such as a Natural Heritage Conservation Area, a Research Natural Area, an Area of Critical Environmental Concern, a designated Wilderness, a conservation easement, or a Habitat Conservation Plan.*

13. Field for other comments that are pertinent to the purpose of this work scope.
14. Priority habitat identification field – either those habitats that are existing investments or commitments; or, those that are of local, regional, or statewide concern.

15. Field for feasibility of restoration. Rated as high, medium, or low.

For the field-mapped polygons the attributes above were entered on a polygon by polygon basis. For remotely-sensed data, the attribution was performed using a combination of plot data and empirical relationships between the attributes and available raster overlay data. For example, in assigning age class values to forest stands, the following criteria were used to make selections of pixels and calculations of value assignments:

If conifer forest and height above ground is between 150 and 200 ft, then ageclass=A
Elseif conifer forest and height above ground >12 and height<150, then ageclass=B
Etc.

Similar assignments were made for condition based on age class and distance from roads, proximity to development, etc. – e.g.:

If conifer forest and ageclass=A and development buffer=0 then Condition=E
…
Else if conifer and ageclass=B and development buffer=1 then Condition=G
Etc.

Figure 7. Vegetation Modeling and Mapping Overview/Workflow

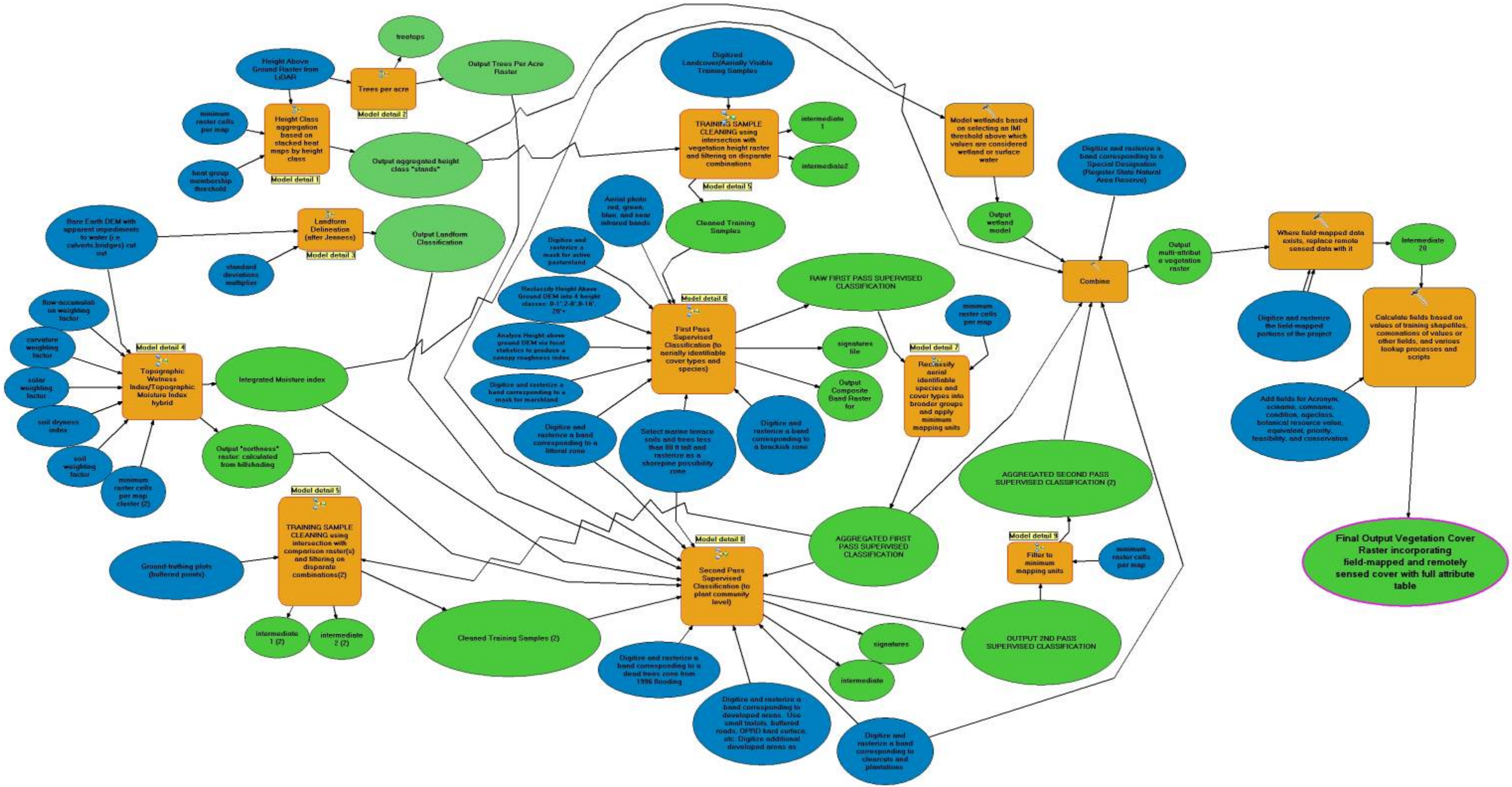


Figure 8. Model Detail 1. Forest Stand Delineation Model Based on LiDAR Data

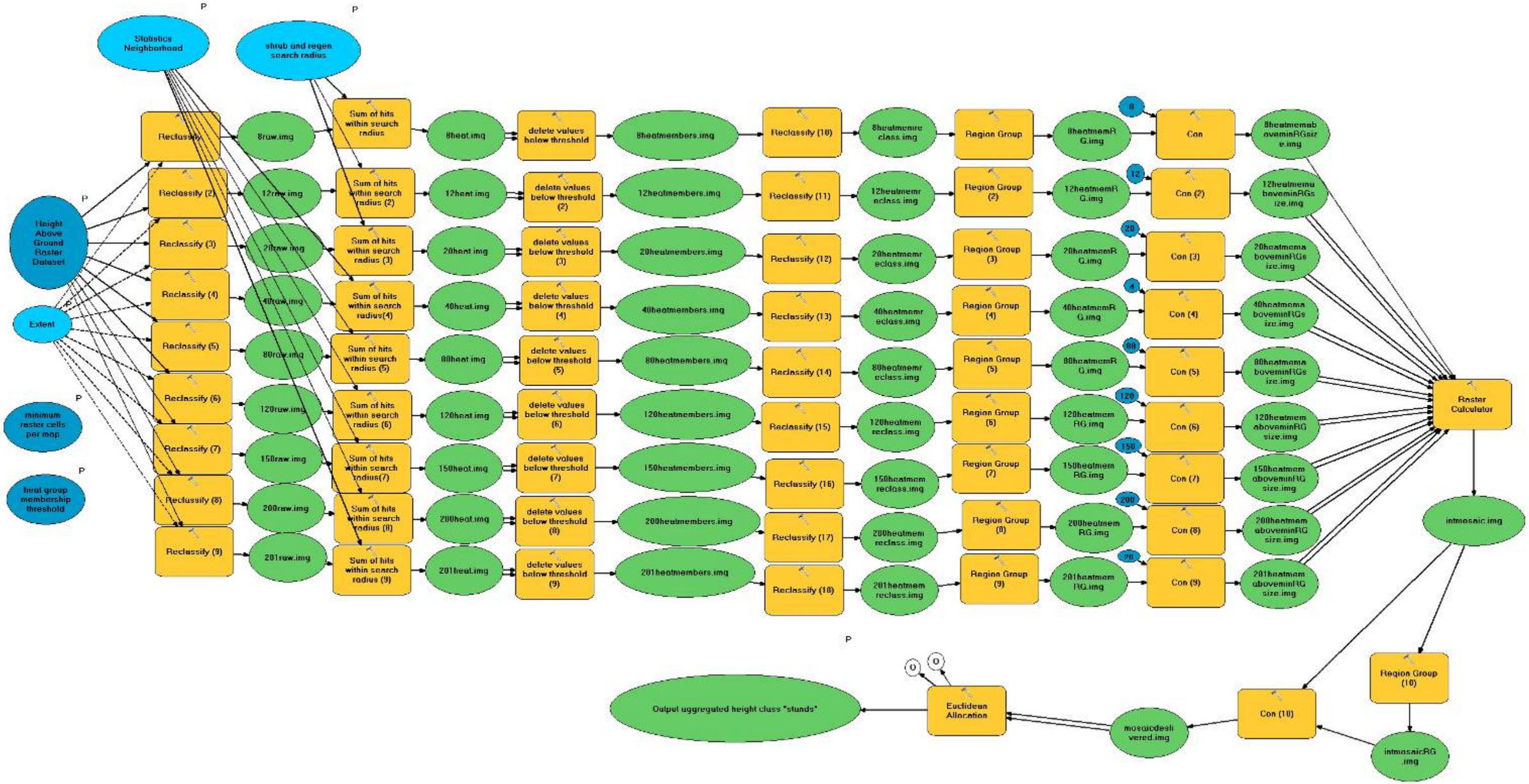


Figure 9. Model Detail 2. LiDAR-based Forest Density Analysis Model

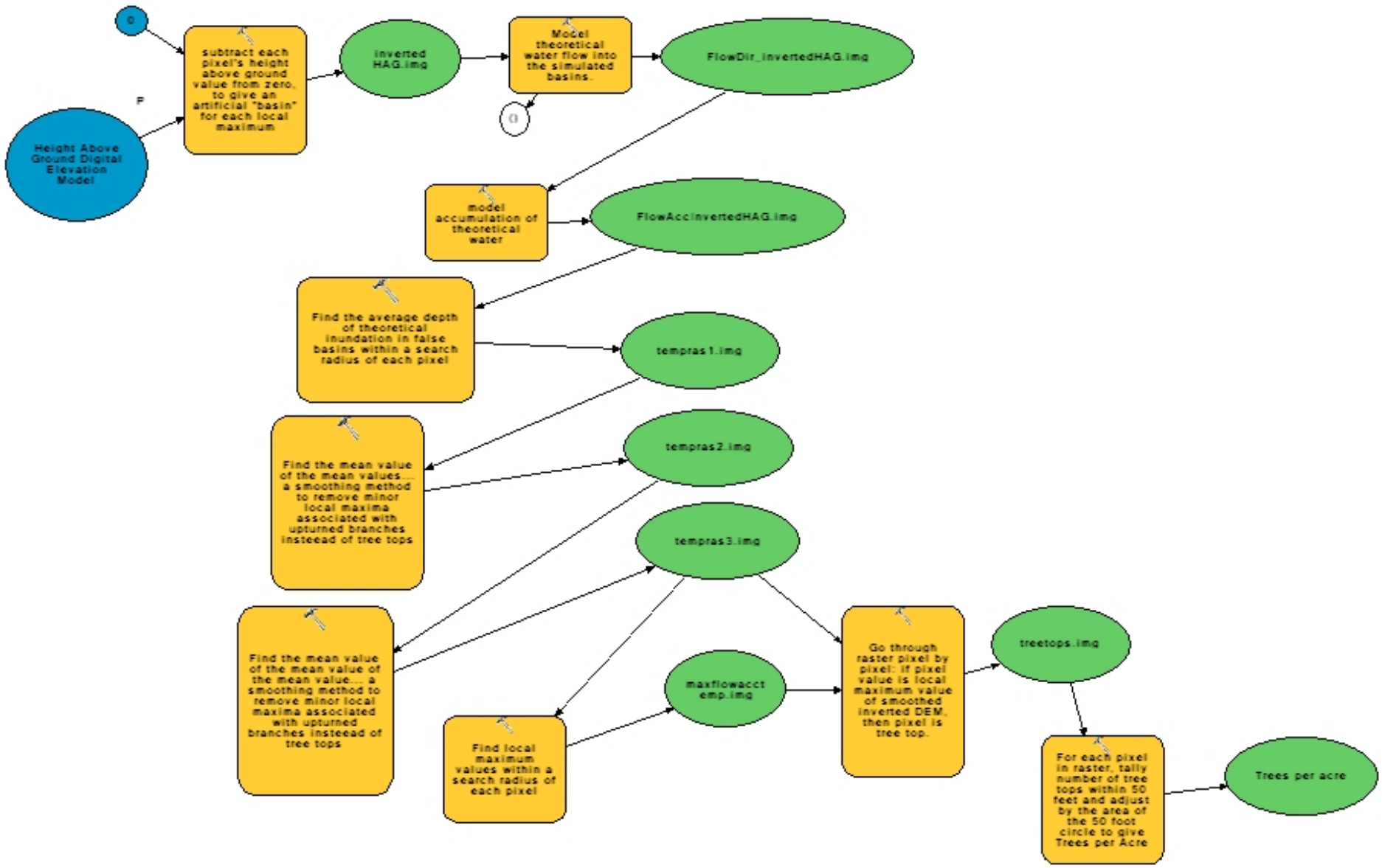


Figure 10. Model Detail 3. Landform/Topographic Position Classification Model (after Jenness and Weiss)

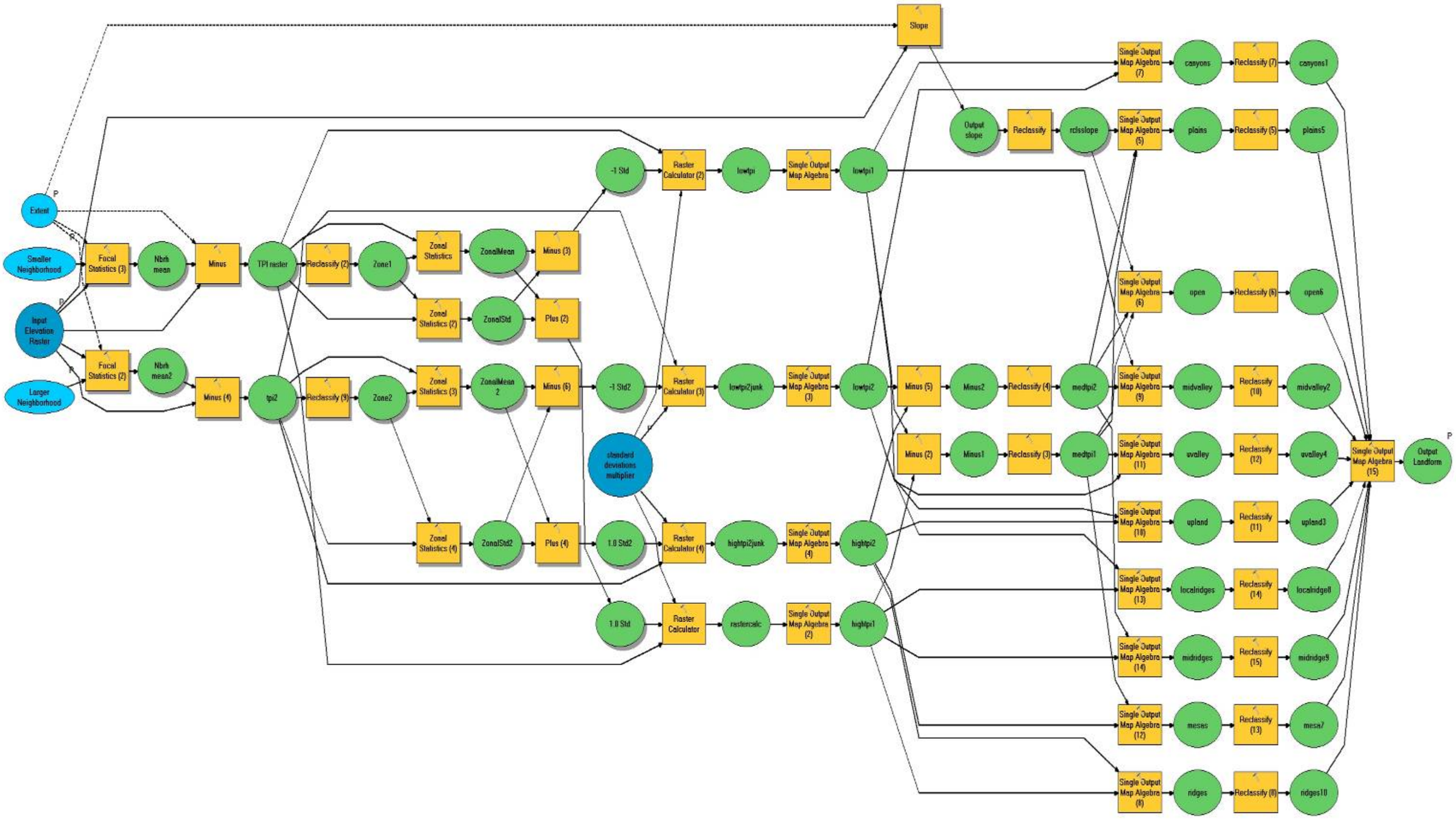


Figure 11. Model Detail 4. Integrated Moisture Index Model

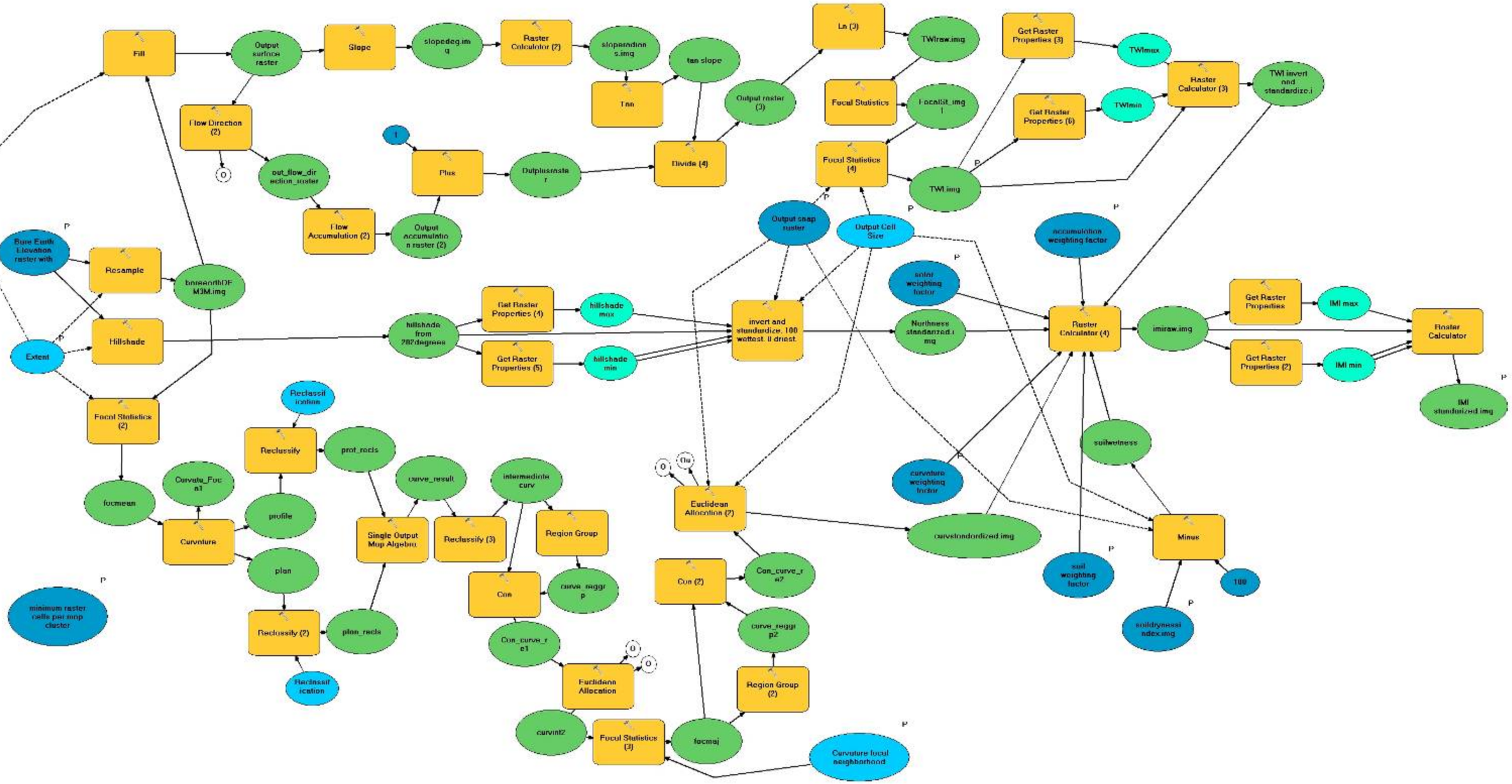


Figure 12. Model Detail 5. Fine-tuning Training Samples to be used in Supervised Classification

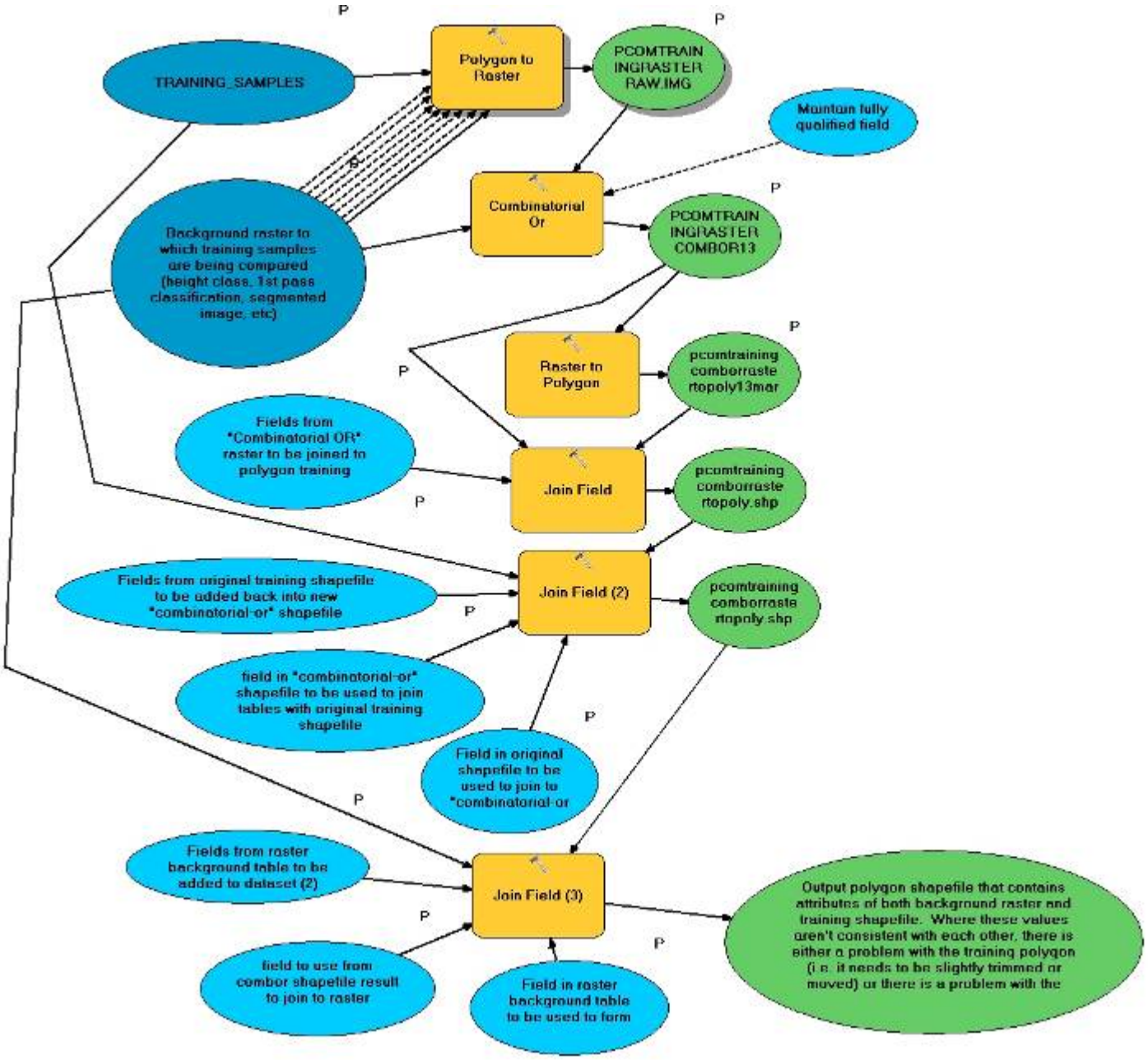


Figure 13. Model Detail 6. First-Pass Supervised Classification

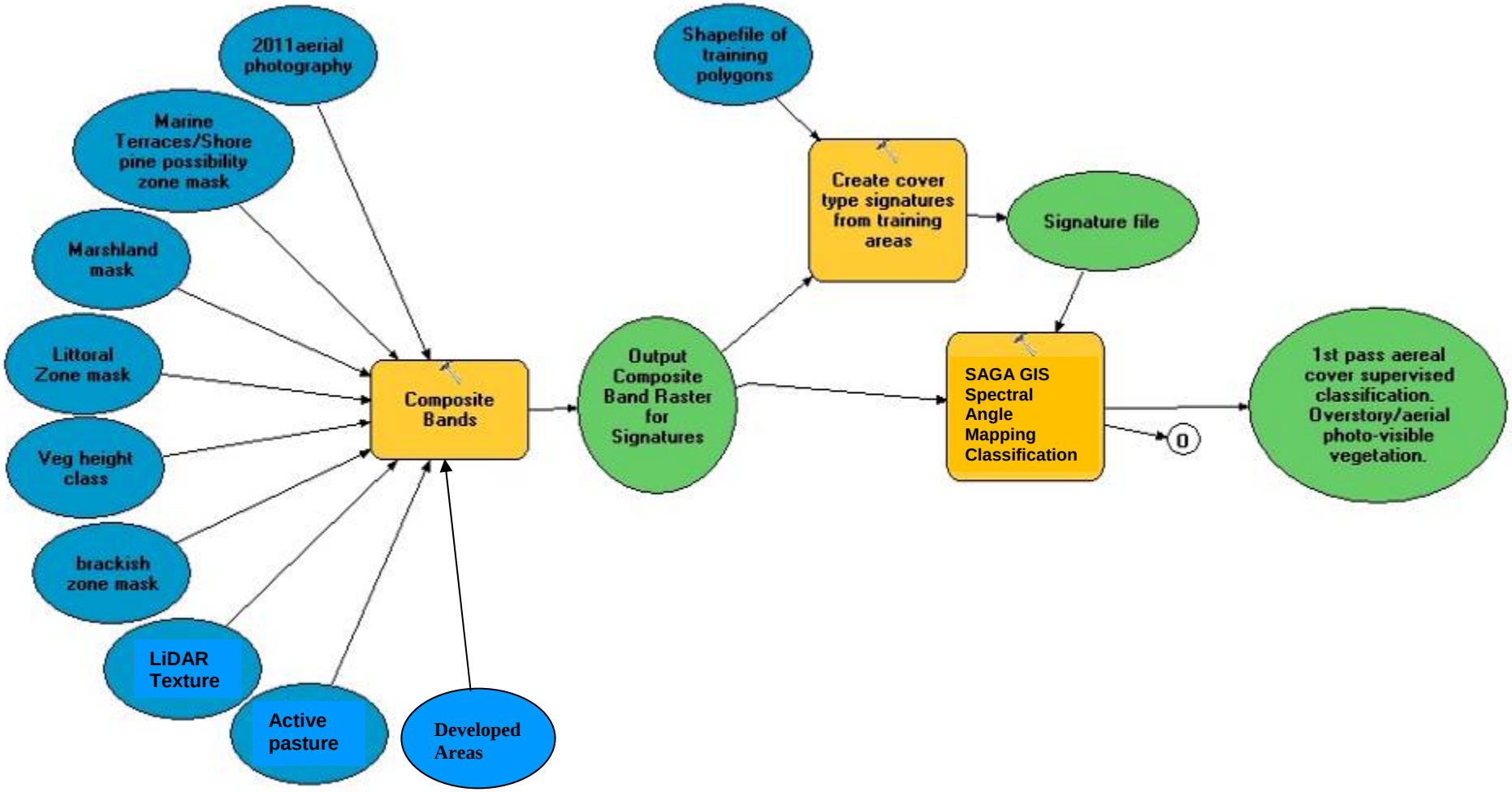


Figure 14. Model Details 7. Aggregation of First-Pass Supervised Classification into larger minimum mapping units

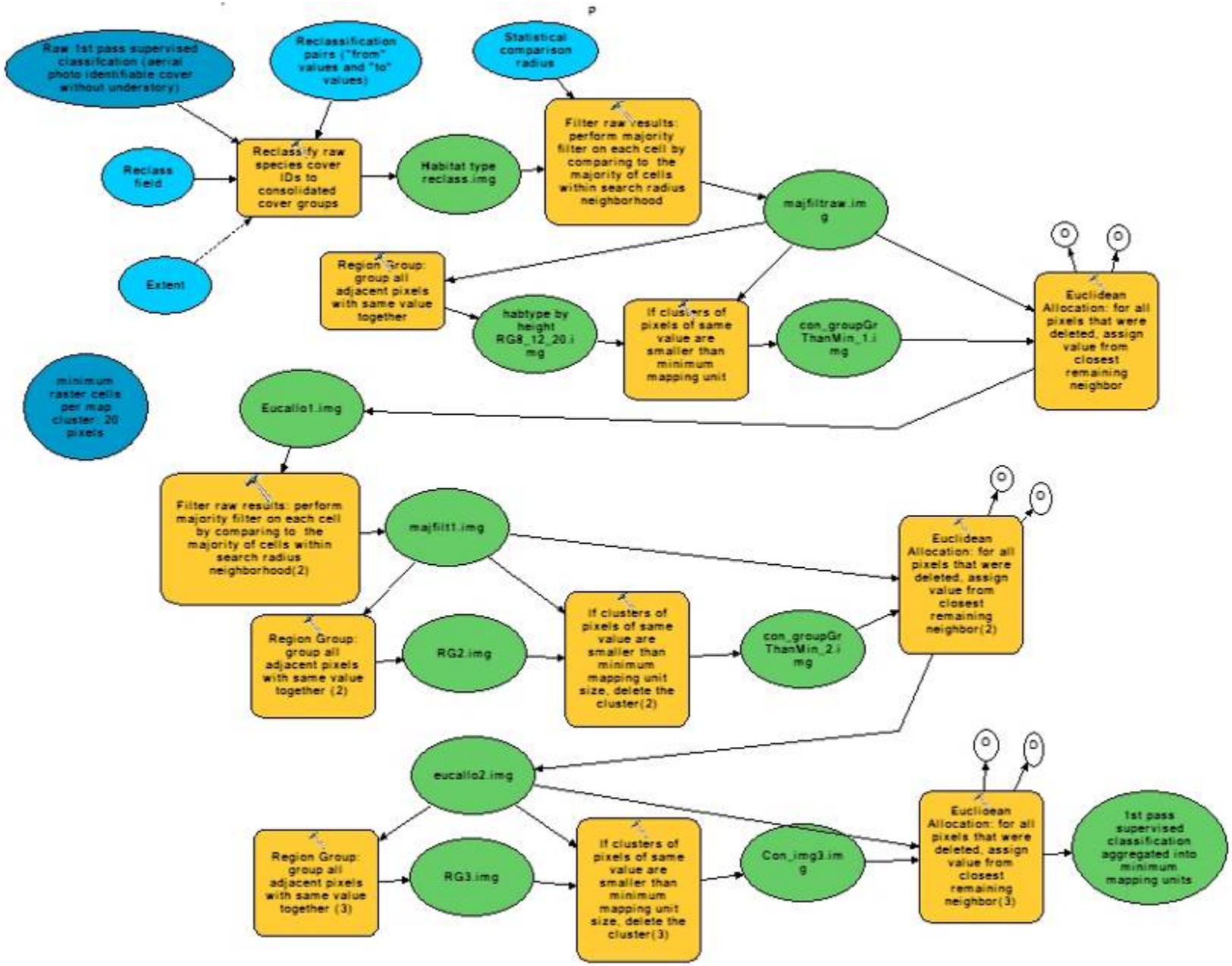


Figure 15. Model Detail 8. Second-Pass Supervised Classification

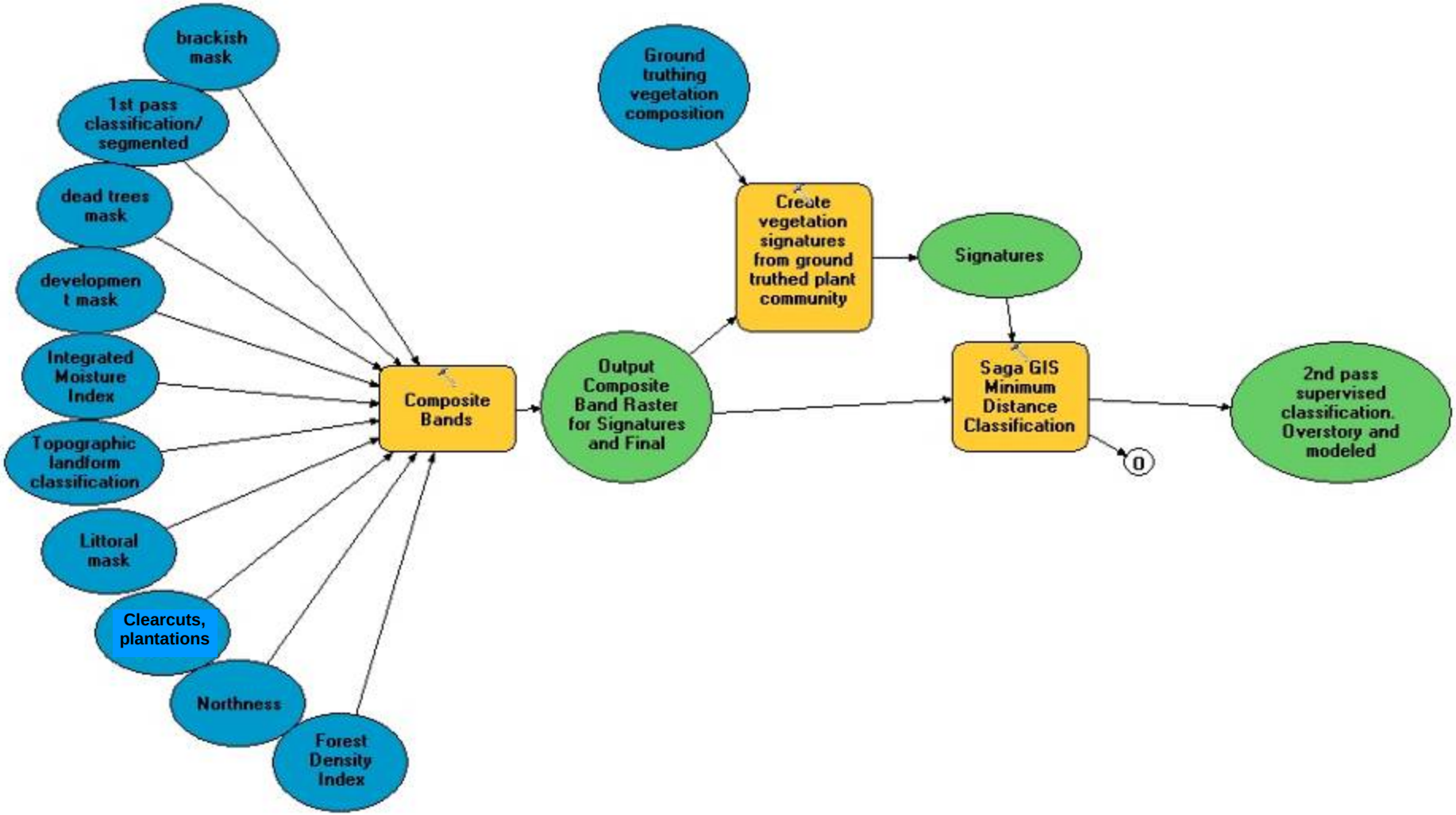


Figure 16. Model Detail 9. Filtering Results to be Above Minimum Mapping Unit Size

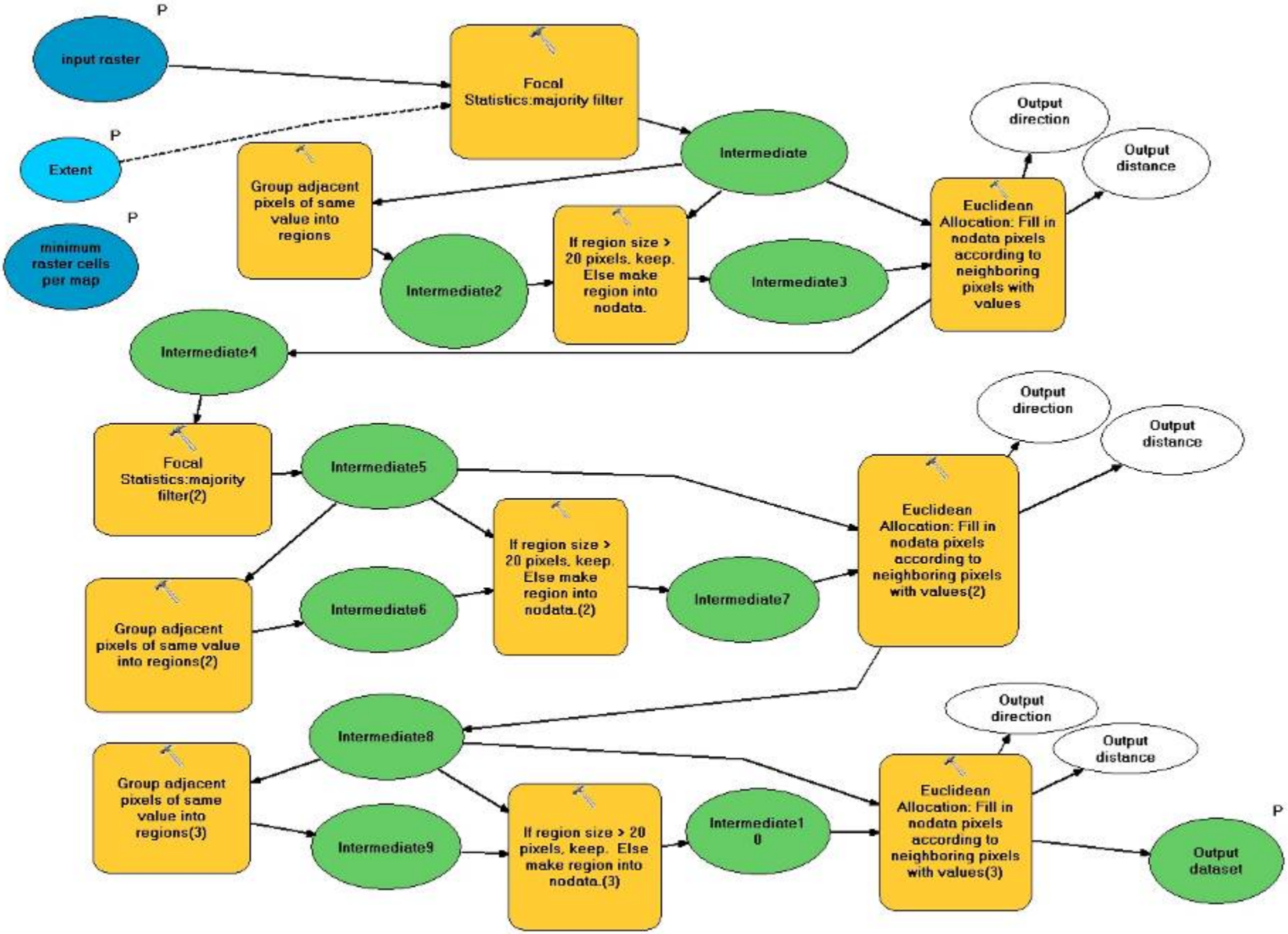


Figure 17. General landcover within the 2011 study area

This figure depicts habitat types of both field-mapped and remotely sensed types. Where available, field-mapped vegetation types replace those that were derived from remote sensing.

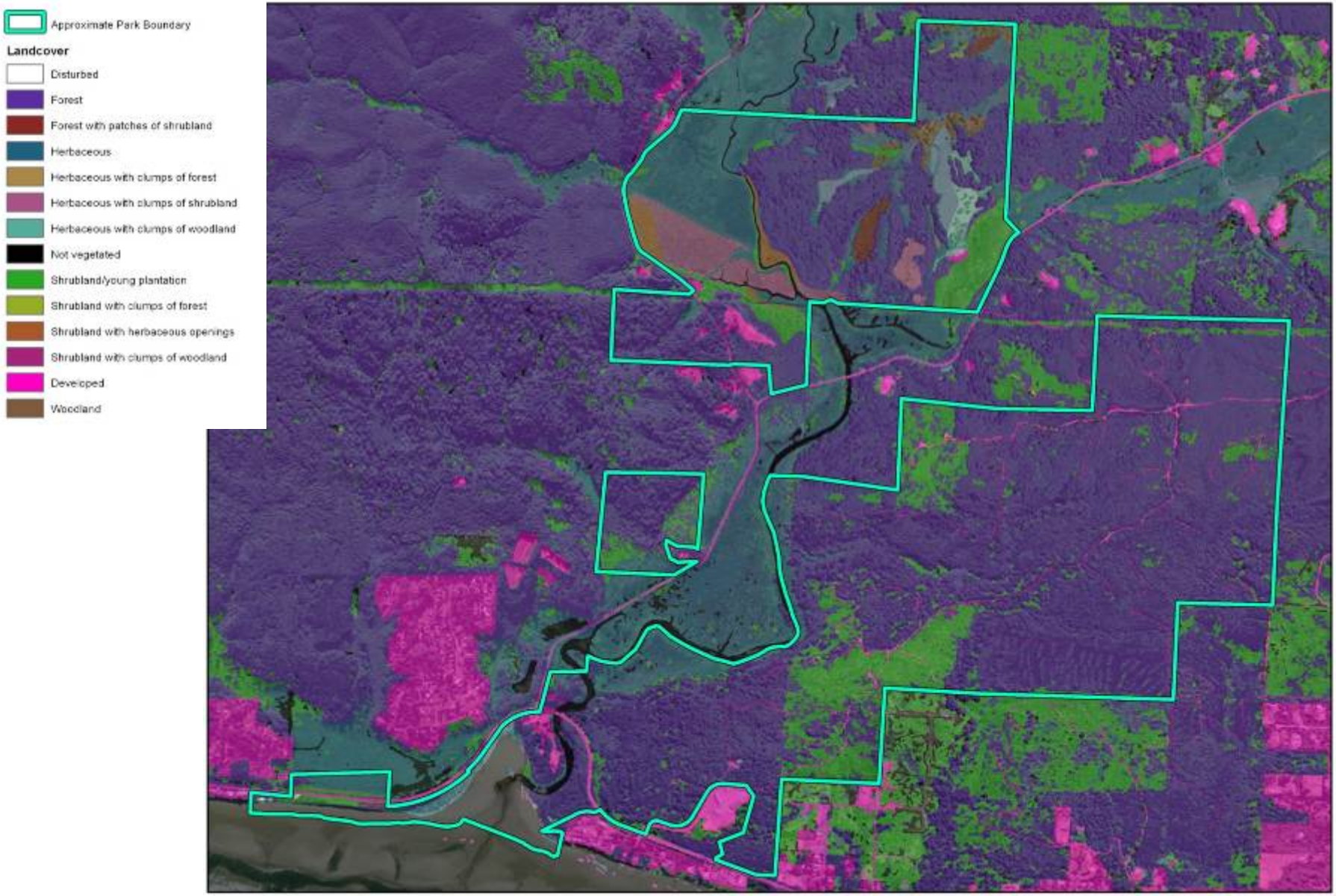


Figure 18. Vegetation Cover Groups / First-Pass Vegetation Classification
(See appendices for detailed plant community mapping and characterization)

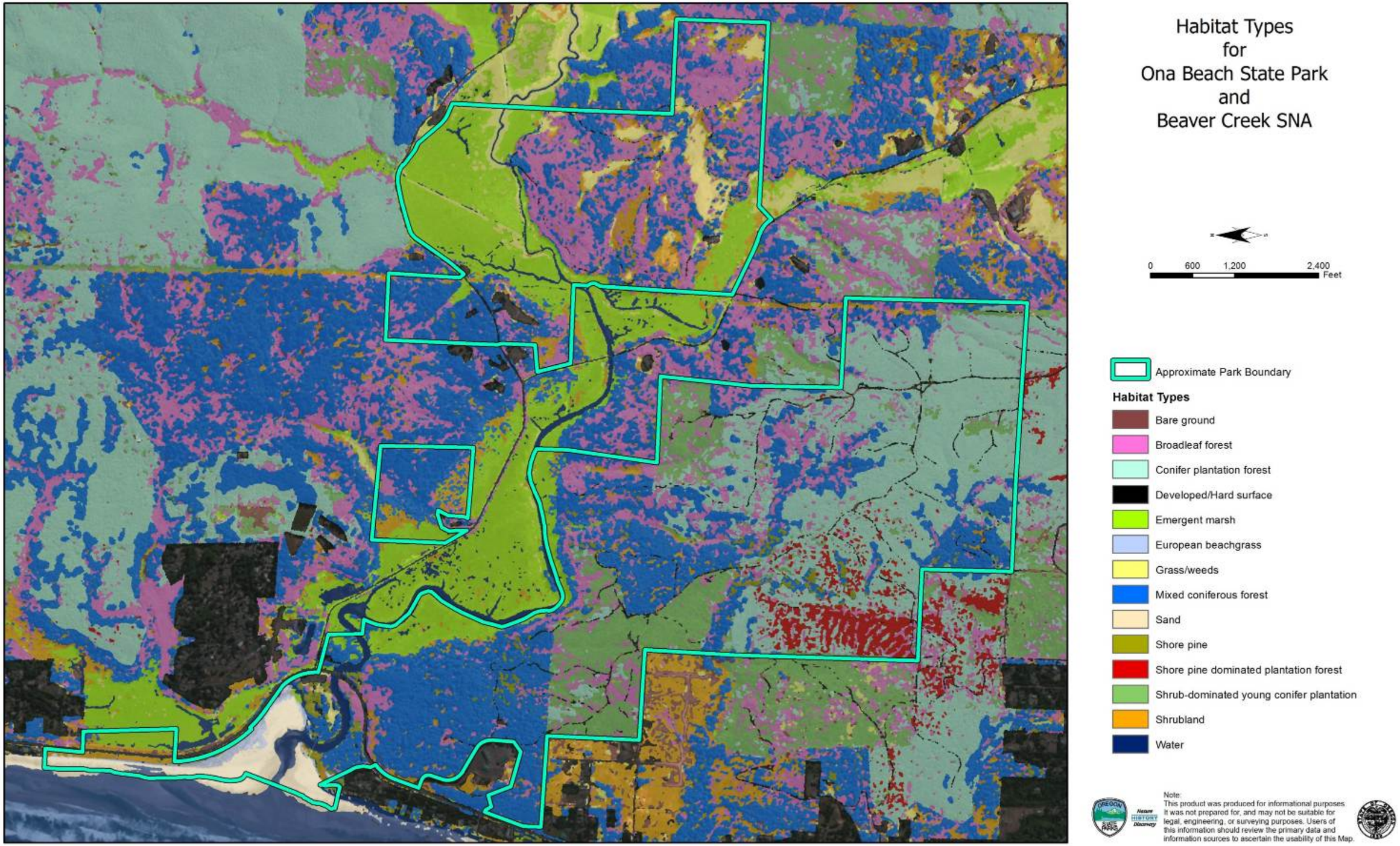
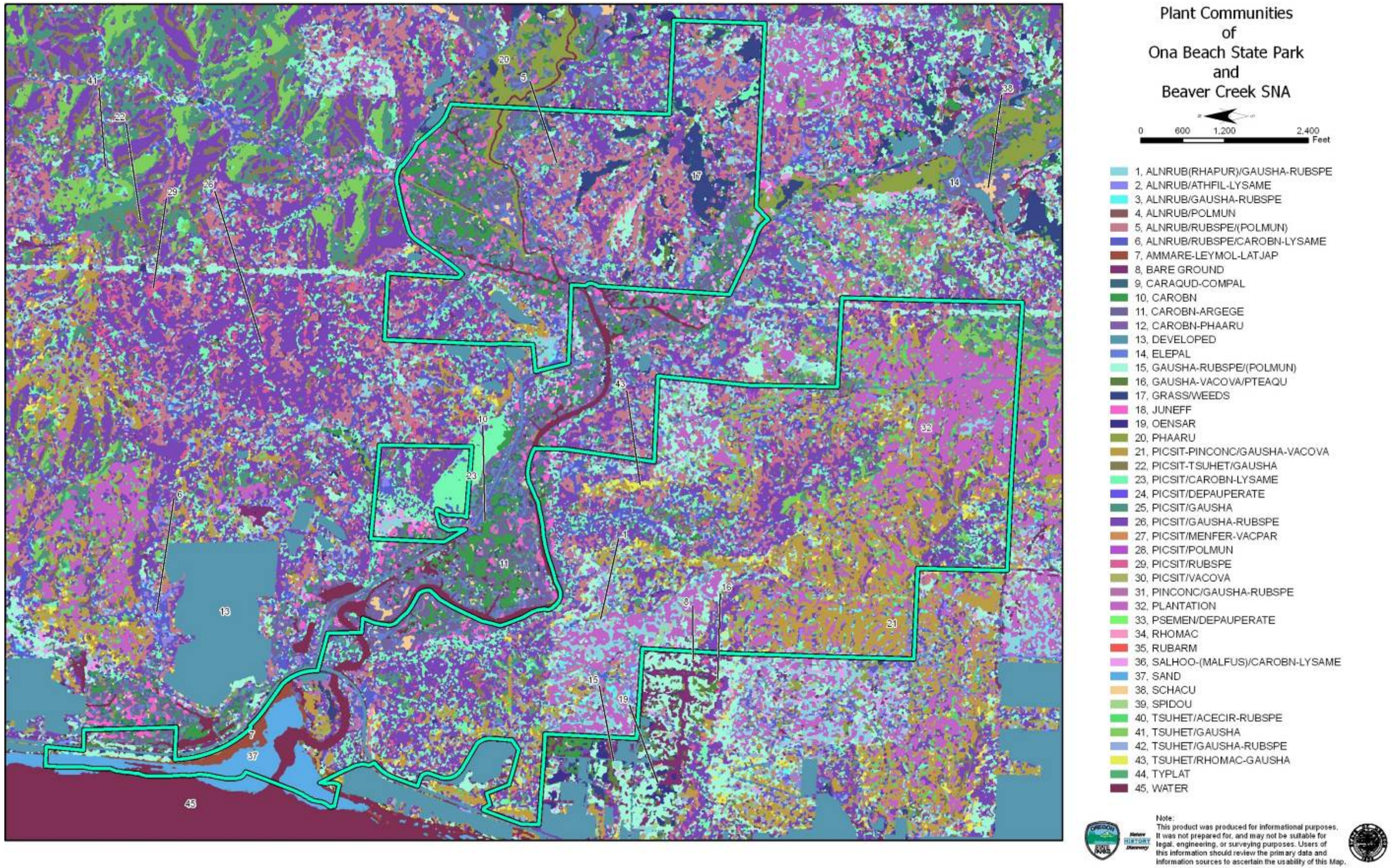


Figure 19. Vegetation Communities / Second-Pass Vegetation Classification

(The communities depicted in this map are grouped according to coarse cover groups and/or published plant associations in the scientific literature. For more detailed field-mapped data and more complete community composition, see the Appendices.)



Plant Communities Present in the Study Area

The general plant community types present within the study area are described below according to their coarse-level mapping codes. Detailed plant community mapping and a list of detailed plant communities are included in this report in Appendix 3; however, detailed text descriptions for each detailed plant community polygon are not included in this report.

The coarse-level plant community names used in this section and in the general plant communities map are simple habitat descriptions that allow the simplified names to encompass a broader group of fine-scale plant communities. In most cases, these communities correspond to plant associations described in the literature or which are included in the Classification of Native Vegetation of Oregon. Component fully-detailed plant community names are listed within the discussion of each coarse grouping's characteristics. In some cases, the coarse level communities correspond exactly to the detailed communities on a one-to-one basis. In these cases, component associations are not applicable, but the detailed plant community name is recorded in the text under the simplified plant community name. The use of coarse cover group names in the body of the report allows for cleaner and less complicated plant community names that are easier to include in text and map legends for the purposes of this report, as well as any planning or assessment products that may be built upon this work. Inclusion of detailed mapping and community description in the appendices assure no loss of data.

Botanical Resource Value ratings (see section below on page 58) for individual plant communities are defined in this report based on the detailed plant communities of Appendix 3, rather than on coarse scale aggregations. This alleviates the confusion that results from propagating the most restrictive Botanical Resource Value rank assigned to a component community throughout the whole coarse mapping unit. In some planning areas where coarse groups are more refined than in the present assessment, propagating the restrictive element through the coarse mapping unit is applicable and appropriate, but in the case of the Wapato Access study area, this propagation would result in huge masses of high conservation priority, when actual extent is much more patchy and spatially limited. Site development planning should refer to the detailed plant community map and the Botanical Resource Value map to identify additional suitable areas. The coarse plant community/habitat type groupings described in the current section serve to introduce the range of habitats present in the park in a format that is easier to understand and absorb, but which is insufficiently detailed for analysis of opportunities and priorities.

Coarse scale plant community descriptions are organized in the following sections according to the habitat type categories of forest, shrubland, herbaceous, non-vegetated, developed, and disturbed. The conservation ranks given are from the Classification of Native Vegetation of Oregon. The codes used in the conservation ranking are described below in text excerpted from that work:

> ***Rank*** *is a code identifying the conservation status of the plant association. It is composed of a global rank ("G") followed by a state rank ("S"). 1 = Critically imperiled because of extreme rarity, with 5 or fewer occurrences or very few remaining acres. 2 = Imperiled because of rarity, with 6-20 occurrences or few remaining acres. 3 = Either very rare and local throughout its range or found locally in a restricted range; uncommon, with 21-100 occurrences. 4 =Apparently secure, though it may be quite rare in parts of its range,*

especially at the periphery; many occurrences. 5 = Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery; ineradicable under present conditions. These standardized ranks are used by all natural heritage programs and conservation data centers throughout North America. They are based on the best available information.

Forested and Woodland Plant Associations (F,W)

Forested areas within the study area fall within several broad groupings defined based on their overstory species composition and their overstory age class. Most of the forest within the study area is mixed hardwood and conifer forest, but there is also some pure coniferous forest. Younger forest arises from two sources: from loss of established forest cover (through disturbance/logging) or from encroachment trees into previously non-forested areas (due to changes in hydrology, disturbance patterns, human planting and land use, etc). The vast majority of the forested areas within the study areas have been logged in the past, and are in various stages of regrowth.

Woodland plant communities occur primarily along the margins of forest or wetlands. There are two essential groups of woodland communities present in the study area: those that are successional, and those that occupy habitat with restrictive hydrology. The successional woodlands are those that are on a trajectory to eventually become forest. They are usually relatively young, and are the result of trees beginning to colonize ground that was previously either farmed, or disturbed by some other force. The woodlands in the study area that occupy areas with restrictive hydrology are those that are too wet to become mature forest. These woodlands are usually flooded into the early summer and are usually composed of Sitka spruce, western redcedar or shore pine.

Map Code 1: ALNRUB(RHAPUR)/GAUSHA-RUBSPE **Rank: G5S4**

red alder(cascara)/salal-salmonberry

Alnus rubra(Rhamnus purshiana)/Gaultheria shallon-Rubus spectabilis

This common plant community occurs widely throughout the study area, primarily in areas recovering from past logging. Conifers likely dominated these areas prior to clearcutting. Alder and cascara are very competitive with conifer seedlings in the early stages of stand reinitiation after logging. Given enough time, these stands will probably succeed to conifer except in areas where disturbance is frequent – due to such forces as erosion, flooding, blowdown, disease, etc. In some areas this community tends towards Oregon crab apple/salmonberry-salal, particularly where seasonally wet. This community tends to be found in moderate environments in terms of soil moisture, as influenced by parameters such as aspect and topographic position.

Map Code 2: ALNRUB/ATHFIL-LYSAME **Rank: G4G5S3**

red alder/common ladyfern-skunkcabbage

Alnus rubra/Athyrium filix-femina-Lysichiton americanus

This swamp community occurs in the wettest of forested microsites. Examples can commonly be found in the bottoms of canyons and on the edges of wetter marshland in the flats. Some of these stands were probably previously characterized by conifers such as spruce and western redcedar, but not all. Some of these alder swamps were present prior to the advent of logging due to

flooding pressures. This may be particularly true on the margins of the bottomland marshes, and less true in the canyons above. This is because of cycles of sand-plugging of the mouth of Beaver Creek – which wouldn't have affected swamps much above the valley floor.

Map Code 3: ALNRUB/GAUSHA-RUBSPE **Rank: G5S4**

red alder/salal-salmonberry

Alnus rubra/Gaultheria shallon-Rubus spectabilis

This common plant community occurs widely throughout the study area, primarily in areas recovering from past logging. Conifers likely dominated these areas prior to clearcutting. Alder and cascara are very competitive with conifer seedlings in the early stages of stand reinitiation after logging. Given enough time, these stands will probably succeed to conifer except in areas where disturbance is frequent – due to such forces as erosion, flooding, blowdown, disease, etc. In some areas this community tends towards Oregon crab apple/salmonberry-salal, particularly where seasonally wet. Like mapcode 1, this community tends to be found in moderate environments in terms of soil moisture, as influenced by parameters such as aspect and topographic position.

Map Code 4: ALNRUB/POLMUN **Rank: GUSU**

red alder/swordfern

Alnus rubra/Polystichum munitum

This common plant community occurs widely throughout the study area, primarily in areas recovering from past logging. Conifers likely dominated these areas prior to clearcutting. Alder is very competitive with conifer seedlings in the early stages of stand reinitiation after logging. Given enough time, these stands will probably succeed to conifer except in areas where disturbance is frequent – due to such forces as erosion, flooding, blowdown, disease, etc. In some areas this community tends towards Oregon crab apple/salmonberry-salal, particularly where seasonally wet. This community differs from the alder/salmonberry/swordfern association in its relative lack of salmonberry. Aspect within these communities tends to be northerly. It can occur in a range of topographic positions, but it is always mesic rather than wet or dry.

Map Code 5: ALNRUB/RUBSPE/(POLMUN) **Rank: G5S4**

red alder/salmonberry/swordfern

Alnus rubra/Rubus spectabilis/Polystichum munitum

This common plant community occurs widely throughout the study area, primarily in areas recovering from past logging. Conifers likely dominated these areas prior to clearcutting. Alder is very competitive with conifer seedlings in the early stages of stand reinitiation after logging. Given enough time, these stands will probably succeed to conifer except in areas where disturbance is frequent – due to such forces as erosion, flooding, blowdown, disease, etc. In some areas this community tends towards Oregon crab apple/salmonberry-salal, particularly where seasonally wet. This community differs from the alder/salmonberry/swordfern association in its relative lack of salmonberry. This community occurs in mesic areas that are neither very moist nor very wet. Aspects and topographic positions are variable. This community tends to be less associated with north slopes and dense shade than ALNRUB/POLMUN and tends to be on moister ground than ALNRUB/GAUSHA-RUBSPE.

Map Code 6: ALNRUB/RUBSPE/CAROBN-LYSAME **Rank: G4S4**

red alder/salmonberry/slough sedge-skunkcabbage

Alnus rubra/Rubus spectabilis/Carex obnupta-Lysichiton americanus

This swamp community is transitional between the wetter alder/slough sedge-skunk cabbage and the drier alder/ salmonberry/(swordfern) types. Salmonberry and other shrubs often occur on hummocks or decayed logs and stumps. This community occurs in canyon bottoms, draws, flats, and other water collecting areas. Many of the representatives of this vegetation type may have historically been dominated by Sitka spruce prior to the advent of logging, but others may have been maintained as alder types, especially in the bottomland where periodic flooding may have keep the spruce from achieving long-term dominance.

Map Code 21: PICSIT-PINCONC/GAUSHA-VACOVA **Rank: G3S3**

Sitka spruce-shore pine/salal-evergreen huckleberry

Picea sitchensis-Pinus contorta var. contorta/Gaultheria shallon-Vaccinium ovatum

shore pine/salal-evergreen huckleberry-salmonberry or shore pine/Pacific rhododendron

Pinus contorta var. contorta/Gaultheria shallon-Vaccinium ovatum-Rubus spectabilis

or

Pinus contorta var. contorta/Rhododendron macrophyllum

This plant community complex occurs on ancient marine terraces with relatively sandy soils. These sites tend to be relatively flat. Evergreen huckleberry is sometimes dominant, and pacific rhododendron is sometimes prominent. Minor depressions and areas with higher soil moisture often have slough sedge in modest amounts. Where soils become much moister, this community transitions to shore pine/slough sedge.

Map Code 22: PICSIT-TSUHET/GAUSHA **Rank: G4S3**

Sitka spruce-western hemlock/salal

Picea sitchensis-Tsuga heterophylla/Gaultheria shallon

This community occurs in areas where western hemlock is able to gain a foothold against competition from Sitka spruce. Being very shade tolerant, western hemlock can grow beneath pioneering canopy of Sitka spruce and eventually replace the spruce as the stands become old enough for the spruce to senesce. Douglas-fir is also sometime present in these stands. Other common understory species include evergreen huckleberry, salmonberry, and sometimes red huckleberry or fools huckleberry. Communities such as this one with understories dominated by salal often occur on ridgetops and topographically drier sites.

Map Code 23: PICSIT/CAROBN-LYSAME **Rank: G3S1**

Sitka spruce/slough sedge-skunkcabbage

Picea sitchensis/Carex obnupta-Lysichiton americanus

This swamp community occurs in very wet microsites such as canyon bottoms and flats on the margins of more open wetland types. It is of very high conservation value. Many of the stands

mapped within this plant association are younger stands, perhaps second growth – but there are some significant examples of later seral spruce/slough sedge-skunkcabbage present as well. The older representatives of this type are of the highest conservation priority in this study area.

Map Code 24: PICSIT/DEPAUPERATE Rank: none

Sitka spruce/depauperate understory

Picea sitchensis/depauperate understory

When spruce density reaches a certain level, the shade beneath the spruce canopy precludes the growth of understory species. In some cases the shade is so dense (and the needle litter is so deep) that virtually no other plant species are present. This density occurs only in young to early mature spruce forest that result from disturbance of some kind, such as logging or fire. As these stands age and some of the trees begin to die from competition or from instability due to poor root development and excessive height/root ratio, openings will begin to expand in the canopy. This allows more light to the forest floor and will eventually result in a diversifying forest floor. These communities tend to occur in areas with lower soil moisture, such as upper slopes, broad ridgetops, and benches.

Map Code 25: PICSIT/GAUSHA Rank: G3S2

Sitka spruce/salal

Picea sitchensis/Gaultheria shallon

This community is dominated by spruce and salal. This dominance can sometimes be almost complete, resulting in somewhat poor diversity. These types occur primarily where soils are drier, and species such as salmonberry do not compete as well. Red huckleberry is sometimes present. These communities occur primarily on ridgetops, benches and upper slopes.

Map Code 26: PICSIT/GAUSHA-RUBSPE Rank: G3S3

Sitka spruce/salal-salmonberry

Picea sitchensis/Gaultheria shallon-Rubus spectabilis

This very common association is widespread throughout the study area. Examples occur in a variety of ageclasses and topographic positions. The shrub layer in these stands can be almost impenetrably dense. These communities occur in a mesic moisture regime.

Map Code 27: PICSIT/MENFER-VACPAR Rank: G3S3

Sitka spruce/fool's huckleberry-red huckleberry

Picea sitchensis/Menziesia ferruginea-Vaccinium parvifolium

This community is sporadic and occurs in relatively small patches within the study area. It is often mixed with forests with understory shrubs characterized by salal, salmonberry, and swordfern. It tends to occur on lower slopes and southerly aspects, but can occur in a variety of topographic situations, including benches and minor ridges.

Map Code 28: PICSIT/POLMUN Rank: G3S3

Sitka spruce/swordfern

Picea sitchensis/Polystichum munitum

This community occurs relatively commonly across the study area – primarily on northerly aspects and on mid to lower slopes. It is characterized by a mesic moisture regime. These communities can sometimes be depauperate, but they are often dense.

Map Code 29: PICSIT/RUBSPE Rank: G4S3

Sitka spruce/salmonberry

Picea sitchensis/Rubus spectabilis

This community occurs in mesic areas that are neither very moist nor very wet. Aspects and topographic positions are variable. This community tends to be less associated with north slopes and dense shade than PICSIT/POLMUN and on moister ground than PICSIT/GAUSHA-RUBSPE.

Map Code 30: PICSIT/VACOVA Rank: G3S3

Sitka spruce/evergreen huckleberry

Picea sitchensis/Vaccinium ovatum

This community occurs on flats to upper slopes. Salal is usually present along with evergreen huckleberry. The shrub layer can be extremely dense and difficult to traverse. This community tends to occur in the littoral zone more often than further inland, and seems to be associated with marine terraces and transitions to stand types in which shore pine is present. These communities are mesic, although in flats they can sometimes have mosaics of wetland intermixed in concave areas where slough sedge, salmonberry, and even skunk cabbage can occur.

Map Code 31: PINCONC/GAUSHA-RUBSPE Rank: ~S3

shore pine/salal-salmonberry

Pinus contorta var. contorta/Gaultheria shallon-Rubus spectabilis

This is a relatively uncommon plant association within the confines of the study area. It occurs on ancient marine terraces with relatively sand soils, or in recently colonized dunal areas that have succeeded to forest. Shore pine tends to be dense. Given time, these stands will likely become increasingly colonized by other conifers such as Sitka spruce, western hemlock, and douglas-fir. Some of the areas within the study area mapped as being of this type have been artificially planted.

Map Code 32: PLANTATIONS Rank: none

This community is artificial and results from past logging and subsequent replanting. These communities are often widely divergent from natural stands in that they are composed of overstory tree species that may not occur naturally in these sites. Douglas-fir and shore pine have been planted densely into some of these plantations where the species would not occur naturally. These planting decisions reflect the economics of forest management rather than ecological appropriateness. Most of the douglas-fir dominated areas of these plantations are very unhealthy because of the prevalence of the disease Swiss needle cast. These diseased stands are transitioning via natural recruitment to tree species that were not planted. Progress towards natural tree composition is substantially slowed in some areas by aggressive broadleaf/shrub layers of salal,

cascara, salmonberry, and alder. These broadleaf and shrub components have been able to take dominance because of the poor health of the douglas-fir. In order to speed progress towards natural forest conditions, it may be appropriate to cut back the shrub layer in some areas so that Sitka spruce and western hemlock can gain a better foothold.

Map Code 33: PSEMEN/DEPAUPERATE Rank: none

Douglas-fir/depauperate understory

Pseudotsuga menziesii/depauperate understory

This plant community occurs in second growth douglas-fir stands. In cases such as in these stands, when overstory tree density reaches a certain level, the shade beneath the spruce canopy precludes the growth of understory species. In some cases the shade is so dense (and the needle litter is so deep) that virtually no other plant species are present. This density occurs only in young to early mature douglas-fir forest that results from disturbance of some kind, such as logging or fire. As these stands age and some of the trees begin to die from competition or from instability due to poor root development and excessive height/root ratio, openings will begin to expand in the canopy. This allows more light to the forest floor and will eventually result in a diversifying forest floor. These communities tend to occur in areas with lower soil moisture, such as upper slopes, broad ridgetops, and benches.

Map Code 40: TSUHET/ACECIR-RUBSPE Rank: G4S4

western hemlock/vine maple-salmonberry

Tsuga heterophylla/Acer circinatum-Rubus spectabilis

This plant association tends to occur in the richer, deeper soils on slopes, benches and in draws. Understory vegetation is relatively lush. The presence of vinemaple gives these communities a thicker multistoried canopy with more vertical habitat diversity than is seen in communities with understories dominated by only the lower growing shrubs.

Map Code 41: TSUHET/GAUSHA Rank: G5S4

western hemlock/salal

Tsuga heterophylla/Gaultheria shallon

This community occurs primarily in dry topographic positions such as upper slopes, dry benches, ridges, and on well-drained southern aspects. Besides salal, salmonberry, red huckleberry, and vinemaple often co-occur in the shrub layer. Swordfern is common in the forb layer. This community is relatively sparse in the study area because of the way the study area is situated in the fairly wet topography within the Sitka spruce belt of the coastline. This community is much more common further inland from the ocean shore.

.

Map Code 42: TSUHET/GAUSHA-RUBSPE Rank: G4S4

western hemlock/salal-salmonberry

Tsuga heterophylla/Gaultheria shallon-Rubus spectabilis

This community occurs in mesic areas that are generally drier than areas with more monotonous

salmonberry, and in areas that are generally moister than those dominated by salal. This community is relatively sparse in the study area since because of the way the study area is situated in the fairly wet topography within the Sitka spruce belt of the coastline. This community is much more common further inland from the ocean shore.

Map Code 43: TSUHET/RHOMAC-GAUSHA Rank: G4S4
western hemlock/Pacific rhododendron-salal
Tsuga heterophylla/Rhododendron macrophyllum-Gaultheria shallon

This plant community is very uncommon within the study area, where it occurs only on old marine terraces in mesic topographic positions such as dry benches, upper slopes, and ridges. The small number of samples of this vegetation type do not lend themselves to accurate modeling/mapping of the distribution of this community in the study area.

Shrubland Associations (S)

Shrubland communities are prominent within the study area, and are comprised of three principal groupings: wet shrubland, ocean-influenced shrubland, and disturbance-related shrubland. Shrubland areas associated with the wettest growing conditions are often characterized by willow, Pacific crabapple, salal, salmonberry, and black twinberry. They are often, but not always underlain by moist-site herbs such as sedges and rushes. Oceanically influenced shrublands occur in areas of high wind and salt spray. These areas are typified by stunted pines and spruces, along with salal, wax myrtle, salmonberry, black twinberry, and Hooker willow. Disturbance related shrubland usually occurs in areas disturbed by logging, powerlines, or landslides. These shrublands are mostly transitional communities that would naturally convert to forest without continued disturbance. These communities are often composed of salal, salmonberry, rhododendron, Scouler willow, and/or cascara. Himalaya blackberry and scotch broom are also common inhabitants of disturbance-related shrublands.

Map Code 15: GAUSHA-RUBSPE/(POLMUN) Rank: G4S3
salal-salmonberry/(swordfern)
Gaultheria shallon-Rubus spectabilis/(Polystichum munitum)

This plant community is primarily a disturbance type associated with cleared forest. Given enough time, it is expected that most if not all of these shrublands will convert to conifer forest. Where these types persist on the landscape it is due to periodic disturbance. The dense shrub cover in these areas will inhibit regrowth of conifers for a significant period of time, if conifers have not already become established.

Map Code 16: GAUSHA-VACOVA/PTEAQU Rank: G3S3
salal-evergreen huckleberry/western brackenfern
Gaultheria shallon-Vaccinium ovatum/Pteridium aquilinum

This plant community is primarily a disturbance type associated with cleared forest. Given enough time, it is expected that most if not all of these shrublands will convert to conifer forest. Where these types persist on the landscape it is due to periodic disturbance. The dense shrub cover in these areas will inhibit regrowth of conifers for a significant period of time, if conifers

have not already become established. This plant community is drier than the GAUSHA-RUBSPE/(POLMUN) type described above.

Map Code 34: RHOMAC **Rank: none**
Pacific rhododendron
Rhododendron macrophyllum

This shrubland type is very uncommon in the study area. It may have resulted from disturbance from blowdown or disease, as it only occurs in a couple of small patches in otherwise dense forest.

Map Code 35: RUBARM **Rank: none**
Armenian blackberry
Rubus armeniacus

This invasive community is usually very densely colonized by impenetrable thickets of blackberry. These infestations always occur in previously disturbed areas within the study area, such as those that have been cleared for agriculture or those that have been logged.

Map Code 36: SALHOO-(MALFUS)/CAROBN-LYSAME **Rank: G3S2**
Hooker willow-(Oregon crab apple)/slough sedge-skunkcabbage
Salix hookeriana-(Malus fusca)/Carex obnupta-Lysichiton americanus

This plant community occurs primarily along the margins of the wetter and more open marshland of the bottomlands. It is likely that it is expanding in areas that no longer have cattle grazing to keep it at bay. This shrubland type is likely transitional towards alder and/or spruce swamp, but it may take a significant period of time to build up hummocky topography that will allow easy colonization by these tree species. Much of the open herbaceous marsh of the study area could conceivably succeed to this cover type in the absence of flooding or other events that kill trees and favor herbs and shrubs.

Map Code 39: SPIDOU **Rank: G5S4**
rose spirea, douglas spiraea, hardhack
Spiraea douglasii

This plant community occurs primarily along the margins of the wetter and more open marshland of the bottomlands. It is likely that it is expanding in areas that no longer have cattle grazing to keep it at bay. This shrubland type is likely transitional towards alder and/or spruce swamp, but it may take a significant period of time to build up hummocky topography that will allow easy colonization by these tree species. Much of the open herbaceous marsh of the study area could conceivably succeed to this cover type in the absence of flooding or other events that kill trees and favor herbs and shrubs.

Herbaceous Associations (H)

The herbaceous plant communities present in the study area fall within three broad categories: non-native grassland, emergent marsh/wet meadow, and aquatic submerged or floating herbaceous communities. Each has a distinct conservation value, ranging from none to extremely high.

Map Code 7: AMMARE-LEYMOL-LATJAP **Rank: none, G1S1 where AMMARE absent or minor**

European beachgrass
Ammophila arenaria
American dunegrass-beach pea
Leymus mollis-Lathyrus japonicus

This plant community occurs above mean high tide on the beach and dunes along the ocean. European beachgrass is a non-native species imported to the pacific northwest coast for the purpose of dune stabilization. Its ability to stabilize dunes has caused changes in both the vegetation ecology and the topographic character of dunal habitat. In some places the European beachgrass is nearly a monoculture, but in others American dunegrass, beach pea, silver beach pea, yellow sandverbena, and other native remnants continue to have a significant presence. Pink sandverbena, a state-listed species, has been located in this habitat intermittently in the past.

Map Code 9: CARAQUD-COMPAL **Rank: G2S2**

Sitka sedge-purple marshlocks
Carex aquatilis sp. dives-Comarum palustre

This community occurs primarily in the marsh behind the foredune and on the east side of highway 101, north of Beaver Creek. It is generally in excellent condition and harbors a wide diversity of marshland and aquatic species. Hooker willow, spiraea, and black twinberry are sometimes prominent shrubs in this association, especially on peaty hummocks. Slough sedge is strongly present.

Map Code 10: CAROBN **Rank: G4S4**

slough sedge
Carex obnupta

This marshland plant community pertains to dense patches of slough sedge. Often these patches have very little other vegetation. It intergrades with several other composite communities such as slough sedge-creeping spikerush, slough sedge-Sitka sedge, and slough sedge-pacific silverweed.

Map Code 11: CAROBN-ARGEGE **Rank: G4S4**

slough sedge-Pacific silverweed
Carex obnupta-Argentina egedii

This marsh plant community is characterized by high abundances of slough sedge and pacific silverweed. Creeping spikerush, water hemlock, skunk cabbage, and American brooklime are other common associates.

Map Code 12: CAROBN-PHAARU **Rank: none**

slough sedge-reed canarygrass
Carex obnupta-Phalaris arundinacea

This marshland community is a degraded form of the slough sedge community. Reed canarygrass is an invasive non-native species that often takes over wetlands. Its abundance is governed by several factors: whether it was seeded to improve cattle forage, whether inundation continues past April, and whether herbivores such as cattle selectively graze it. It is expected that reed canary grass will be expanding in areas that do not receive growing-season inundation on at least a periodic basis.

Map Code 14: ELEPAL **Rank: G5S5**

common spikerush

Eleocharis palustris

This marshland community is at the wetter end of the spectrum. Along with the hardstem bulrush community, it occurs in areas that receive the highest water and longest growing-season water retention. These communities are not thought to be at a high degree of risk for reed canarygrass invasion.

Map Code 17: GRASS/WEEDS **Rank: none**

Grasses

Lawn/Mowed grasses

This community composite includes areas such as lawns, grassy rights-of-way, and fallow pasture. It is essentially a non-native community and is made up of primarily weedy species and forage grasses used for cattle grazing.

Map Code 18: JUNEFF **Rank: G5S5**

common rush

Juncus effusus

This marshland community is made up primarily of clumpy common rush. It is often somewhat weedier than other marshland types, and may represent a pioneering wetland community taking over grazing land. Common rush often occurs in disturbed or the drier portions of the marshland systems, but can be a primary native in natural systems too. Water parsley, water hemlock, and American brooklime are common native associates.

Map Code 19: OENSAR **Rank: G4S4**

water parsley

Oenanthe sarmentosa

This wetland plant community occurs primarily in relatively small forest openings on flat ground. Most occurrences are surrounded by red alder forest in this study area. It is commonly associated with the slough sedge forested wetland types. Common associates include water carpet, puccinellia, slough sedge, and monkeyflowers.

Map Code 20: PHAARU **Rank: none**

reed canarygrass

Phalaris arundinacea

This plant community is characterized by near monocultures of the invasive non-native reed canarygrass. It is usually a marshland community in this study area, but can occur in upland situations as well.

Map Code 38: SCHACU **Rank: G5S5**
hardstem bulrush
Schoenoplectus acutus

This very wet plant community occurs at the wet end of the marshland spectrum within the study area. Along with the creeping spikerush communities, it occurs in areas that receive the highest water and longest growing season water retention. These communities are not thought to be at a high degree of risk for reed canarygrass invasion.

Map Code 44: TYPLAT **Rank: G5S5**
broadleaf cattail
Typha latifolia

This plant community occurs at the wet end of the marshland spectrum within the study area, but can thrive in somewhat drier conditions than can the hardstem bulrush and creeping spikerush communities. Cattail communities are considered fairly aggressive, and can under certain circumstances invade other more diverse marshland plant communities. Due to the aggressive nature of cattail, these communities are not thought to be at a high degree of risk replacement by reed canarygrass.

Developed Areas (V)

This land cover type within the park is characterized by simple man-made facilities that include mowed lawn, structures, and parking areas.

Non-vegetated Areas (N)

Map Code 8: BARE GROUND

This is usually a disturbance feature that occurs in association with roadsides, turnarounds, and logging impacts.

Map Code 37: SAND

Map Code 45: WATER

At-Risk Plant Species

A number of at-risk plants are known from the study area's local vicinity (see Figure 21). Pink sandverbena (*Abronia umbellata spp. breviflora*) has been intermittently present on the beach at the mouth of Beaver Creek in the past. None was located in the course of 2011 field work although habitat continues to exist. There is also potential habitat for a number of other rare species (see Figure 20).

At-risk species known from the study area vicinity are:

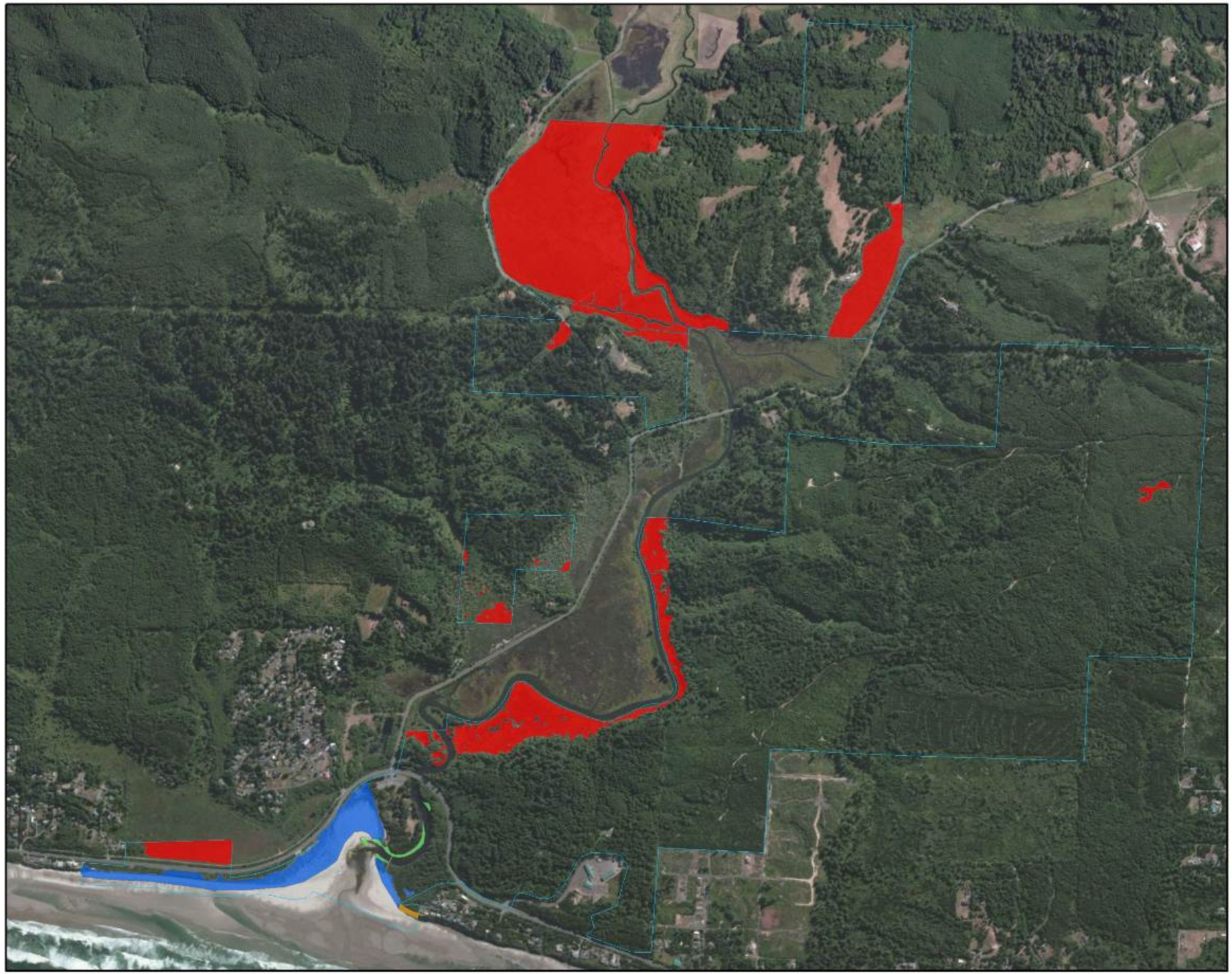
Scientific Name	Common Name	Federal Status	State Status	ORBIC List
Abronia umbellata ssp. breviflora	Pink sandverbena	SOC	LE	1
Abronia latifolia	Yellow sandverbena			4
Atriplex gmelinii var. gmelinii	Gmelin's saltbush			2
Atriplex leucophylla	Beach saltbush			3
Carex brevicaulis	Short-stemmed sedge			2
Eriophorum chamissonis	Russet cottongrass			2
Gillia millefoliata	Seaside gillia	SOC		1
Lycopodiella inundata	Northern bog clubmoss			2
Polypodium calilrhiza	Hotroot polypody			3

The only definite at-risk species discovered within the study area during this study's fieldwork was yellow sandverbena (a watch-list species). In addition, an area of what may be big-headed sedge (also a watch list species) was located, but was not conclusively identifiable due to lack of flowering parts.

There are a number of other rare or at-risk species known from the central coast for which habitat may be present. Appendix 2 lists species tracked by ORBIC that are known to occur within the Coast Range ecoregion of Lincoln, Tillamook, and/or Lane Counties. Survey timing may not have been appropriate for optimum surveyability for all of these species. The list has not been filtered for only those species for which habitat is present on the park's property.

It was not within the scope of this assessment to survey exhaustively for sensitive species throughout the study area. Sensitive species surveys should be performed on a site-specific basis once any broad planning concepts or potential areas of future development are known.

Figure 20. Potential Habitat for Listed and Other Rare Plant Species



Potential Habitat for At-Risk Plant Species
in the Vicinity of
Ona Beach State Park
and
Beaver Creek SNA

- Abronia umbellata ssp. breviflora, Gilia millefoliata, Atriplex leucophylla, Atriplex gmelinii var. gmelinii, Carex brevicaulis, Polypodium calirhiza, Carex macrocephala, Abronia latifolia
- Atriplex gmelinii var. gmelinii, Carex brevicaulis, Cordylanthus maritimus ssp.palustris
- Lycopodiella inundata, Eriophorum chamissonis, Anemone oregana var. felix
- Polypodium calirhiza

Note:
This product was produced for informational purposes. It was not prepared for, and may not be suitable for legal, engineering, or surveying purposes. Users of this information should review the primary data and information sources to ascertain the usability of this Map.

Figure 21. Known Occurrences of At-Risk Plant Species in the Study Area's Vicinity as Recorded in the ORBIC Database or as Encountered During Fieldwork

Figure redacted in this published version of this report to protect endangered species

Wetlands

A large portion of the study area is wetland. Some of the wetlands indicated in the wetland model are only seasonally wet (being wet for most of the year but becoming quite dry in the height of the summer growing season), but a large proportion is wet year-round. The wettest and most characteristically "marshy" and obvious areas are in the bottomland associated with Beaver Creek.

Aside from the obvious wetlands associated with the Beaver Creek bottomlands, there are many wetlands associated with canyons, draws, and benches throughout the study area. Some of these are rich and important habitats, while others are degraded by past land use.

Wetland Mapping Accuracy and Completeness

No formal delineation was done in the course of this study. For field-mapped portions of the study area, all assessment of potential wetlands was based on above ground indicators observed in the field. For remotely-sensed portions of the study area, wetland mapping was based on a hydrological model created from hybridizing topographic wetness index and integrated moisture index models. Using field experience and known wetlands as a calibration guide, a threshold value was selected to indicate likely wetlands.

True wetland and water feature extents are often smaller than those depicted in Figure 22. This extent issues arise for three reasons:

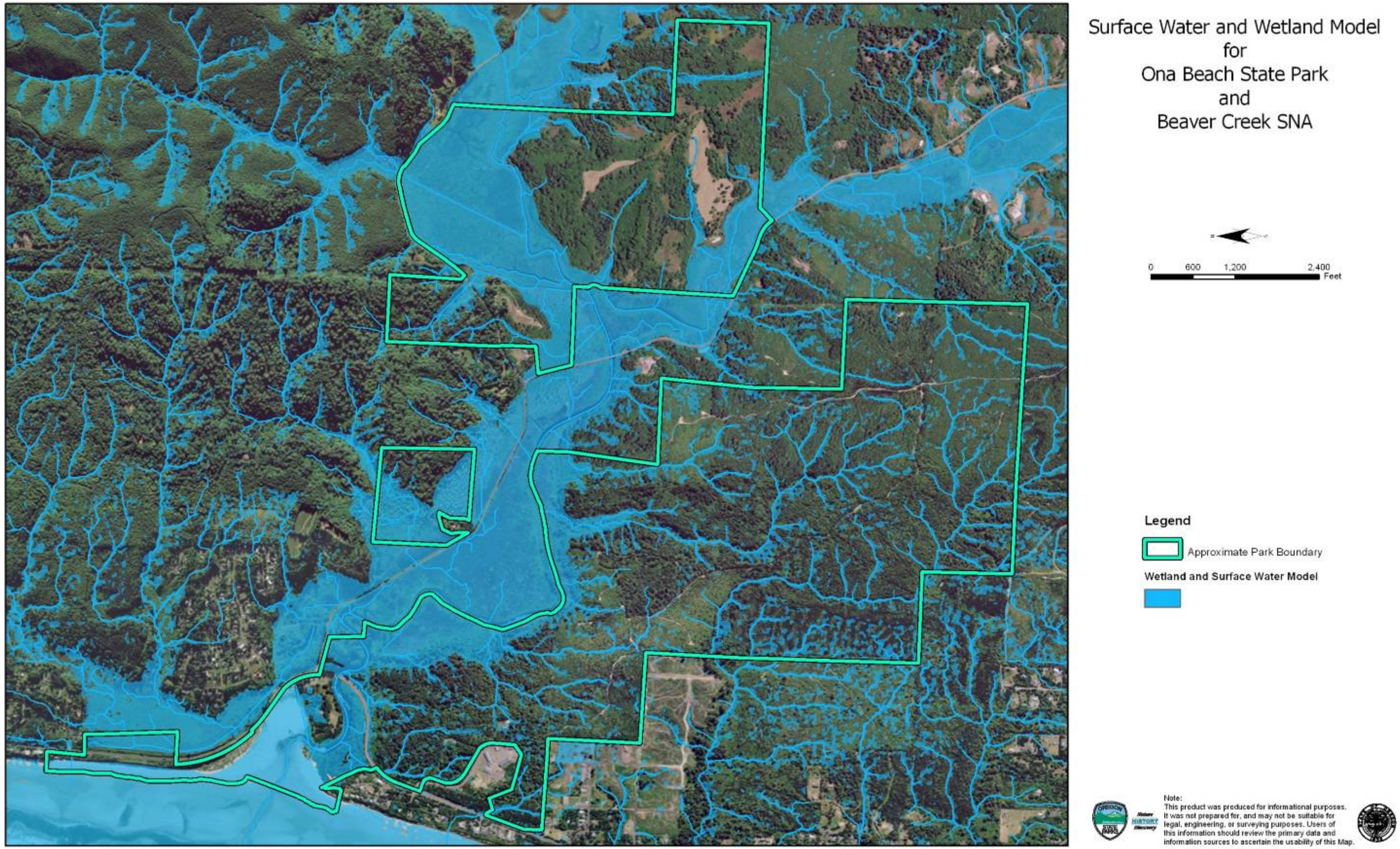
1) wetlands and non-wetlands often intermingle in mosaics of habitat in which it is not feasible to delineate true extents of wetland within the scope of this assessment. This patchwork is often made up of small patches of upland within areas predominantly wetland, or the converse – small wetlands in a matrix of upland. In many cases, hummocky ground is wet in the troughs and dry on the tops of the hummocks and minor ridges. *In this assessment, when true wetland extents are not mappable for reasons of habitat complications or "mosaicing", the extent of the upland/wetland mosaics are mapped.*
2) Wetlands mapped on the subjective basis of surface indicators do not take all wetland indicators into consideration. Soil and subsurface hydrology characteristics must also be assessed in the process of formal wetland determination and delineation. In some cases, features mapped as wetlands based on surface vegetation are not actually wetlands when subjected to the full range of subsurface tests. In other cases, an area that is actually wetland might not be mapped as such based on vegetation alone because characteristic vegetation was absent due to deep shade under a forest canopy. This assessment intended to conservatively map potential wetlands – opting to err on the side of including rather than excluding potential wetlands. Potential wetlands and areas that include wetlands but for which boundaries are imprecise are mapped as possible and partial wetlands. Those features that are indubitably wet or that show a preponderance of obligate wetland vegetation are mapped as wetlands without these qualifying labels.
3) Modeled hydrology is based in part on inexact data. The data contributing to the formation of the wetland model are topography and soils. Since topography (which

includes slope curvature, topographic position, aspect, and flow accumulation modeling) is based on accurate LiDAR data, this data is fairly reliable where shrub densities are moderate. Some problems were noted in use of the bare ground elevation model derived from LiDAR in that dense vegetation was sometimes sampled as "ground", because the LiDAR laser pulses rarely penetrated the dense shrubs. In these cases, any clearings in the otherwise dense shrub vegetation appear to be concavities in the ground surface, which would naturally appear to be areas for water to accumulate. These shrub-ground discrepancies are impossible to detect without field reconnaissance. Existing soils datasets, which were also used in modeling potential wetlands, are coarsely mapped and are replete with small unmapped inclusions of minor soil components. The transitions between these soil mapping units and the lack of fine-scale detail within them causes some degradation of the accuracy of the hydrology model due to missed or misplaced areas of impermeability, or excessive permeability.

Because of the limited scope and detail of this assessment's treatment of wetlands, any use of the wetland features mapped in this assessment should only be for general planning purposes. Specific construction designs that overlap with or closely approach these areas will need official wetland determination and delineation, leading up to Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE) wetland permits.

Figure 22. Wetlands: Known, Potential

Modeled wetlands and water courses based on soil permeability and LiDAR-derived, bare-earth-DEM-based flow-accumulation, sun exposure, and terrain curvature modeling).



Exotic Plants

Exotic plants are widespread and abundant throughout heavily impacted portions of the study area. A few areas of nearly pristine conditions are present, and in these areas weeds are nearly non-existent.

The most degraded habitats present in the study area are those that have been farmed in the past, and seasonally inundated areas where reed canarygrass has taken over. The least invaded habitats are late seral forest with shady understories and relative lack of human alteration. Permanently very-wet areas are likewise rarely invaded by non-native plants to a high degree.

Former wetland pastures are often colonized by reed canarygrass. Yellow flag iris, creeping buttercup, and colonial bentgrass are other common wet prairie invaders. Broadleaf forested wetlands often have substantial reed canarygrass, and sometimes himalaya blackberry or creeping buttercup.

Upland grassland, shrubland, and forest edges are generally infested with Himalaya blackberry, thistles, and non-native pasture grasses.

Densely coniferously-forested areas on the property are rarely degraded by ivy, blackberry, and herb robert.

Prominent, high priority weed infestations are depicted in Figure 23, by weed species. Areas not containing mapped infestations of high priority weeds are sometimes not free of weeds - just free of high-priority weeds. See also the detailed plant community descriptions in Appendix 3B for the principal exotic plant components of each community.

Yellow flag iris distribution was mapped from data recorded by the Lincoln Soil and Water Conservation District.

Of the 261 plant species recorded for the study area, 89 are non-native – corresponding to a 34% ratio of non-native to native species. Of the 89 non-native species, 8 are listed by the Oregon Department of Agriculture as list “B” Noxious Weeds. These listed noxious weeds along with other species deemed to be of high significance for the study area are listed in the following table.

State listed and high priority noxious weeds found in the study area:

Common Name	Scientific Name	ODA List
Armenian blackberry	*Rubus armeniacus*	B
Bittersweet nightshade	*Solanum dulcamara*	Not listed
Bull thistle	*Cirsium vulgare*	B
Canada thistle	*Cirsium arvense*	B
Common St. Johnswort	*Hypericum perforatum*	B
English holly	*Ilex aquifolium*	Not listed (ornamental)
English ivy	*Hedera helix*	B
Evergreen blackberry	*Rubus lacinatus*	Not listed (crop species)
Herb robert	*Geranium robertianum*	B
Reed canarygrass	*Phalaris arundinacea*	Not listed (cattle forage species)
Robert geranium	*Geranium robertianum** [B]	B
Scotch broom	*Cytisus scoparius*	B
Tansy ragwort	*Senecio jacobaea** [B]	B
Yellow flag iris	*Iris pseudacorus*	B

As can be seen in the table above, several weed species treated in this study are not listed as noxious weeds by the Oregon Department of Agriculture. This does not mean that these species are not threats to the environment in the same way that listed weed species are. In fact, most botanists would agree that reed canarygrass is one of the most prolific and disruptive weeds of wetland systems in Oregon. The reason it is not listed is because it is sometimes planted by cattle ranchers to improve pasture – especially wet pasture. Similarly evergreen blackberry can be as invasive as Himalaya (Armenian) blackberry, but evergreen blackberry is an important economic crop in the Willamette Valley, and is widely grown in home gardens for its fruit. Because of the economic value of these species, the Department of Agriculture does not list them as “Noxious”.

The entirety of the Beaver Creek/Ona Beach study area was not surveyed in detail for weeds, so this assessment does not indicate that there are not important weeds outside those listed above. Given the habitat types present in the park as a whole, there are a number of **additional** species that should be on the park’s list of species to be aware of or to manage proactively. The following list provides some additional species of significant concern. *It is not exhaustive*.

Wetlands

Purple loosestrife, *Lythrum salicaria*
Common reed, *Phragmites australis ssp. australis*
Japanese knotweed, *Fallopia japonica (Polygonum cuspidatum)*
Giant knotweed, *Fallopia(Polygonum) sachalinense*
Bohemian knotweed, *Fallopia (Polygonum) x bohemicum*
Water primrose, *Ludwigia hexapetala*
S. American waterweed, *Egeria densa*

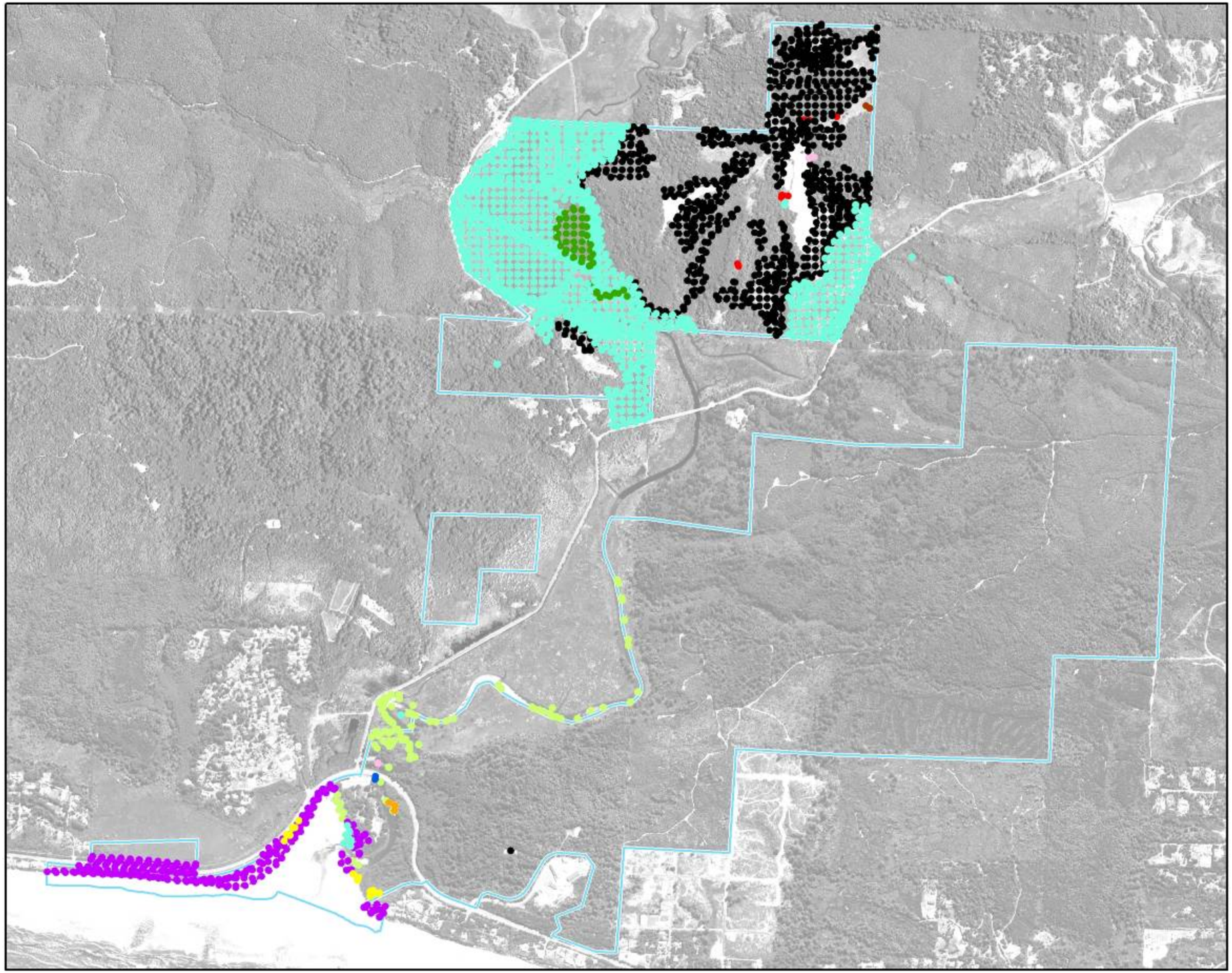
Meadows/openings

French broom, *Genista monspessulana*
Portuguese broom, *Cytisus striatus*
Spanish broom, *Spartium junceum*
Meadow knapweed, *Centaurea pratensis*
Spotted knapweed, *Centaurea maculosa*
Diffuse knapweed, *Centaurea diffusa*
False brome, *Brachypodium sylvaticum*

Forests

Shining geranium, *Geranium lucidum*
False brome, *Brachypodium sylvaticum*

Figure 23. Significant Infestations of Invasive Plant Species.



Significant Known Invasive Plant Sites
of
Ona Beach State Park
and
Beaver Creek SNA

0 600 1,200 2,400 Feet

Approximate Park Boundary

Invasive Plant Species

- Colonial bentgrass
- European beachgrass
- Canada thistle
- Scotch broom
- Herb robert
- English ivy
- Yellow flag iris
- Reed canarygrass
- Armenian blackberry
- Evergreen blackberry
- Bittersweet nightshade

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Botanical Resource Value Ratings for Potential Development

Botanical Resource Value for potential development is assessed by combining six environmental characteristics of each plant community. These ecological parameters are conservation ranking, condition, restoration priority, restoration feasibility, wetland status, and age class (for forested communities). The interaction of these parameters in assignment of a Botanical Resource Value rating is described in detail in the "Methods" section of this report. Rare species presence and habitat, although also assessed in this study, are treated as separate overlays and do not play into the Botanical Resource Value rating in this study. Botanical Resource Value captures information about plant communities, their ecological condition, and relative value for preservation. Generally speaking, the higher the Botanical Resource Value class number is, the more developable the site is *from a plant community perspective*. Botanical Resource Value is just one factor in later determination of a composite suitability that factors in rare species, wetlands and waterways, historical, cultural, wildlife, and other types of restrictions. Composite suitability determinations are made in the course of Master Planning process, when all resource and land-use-related variables are assessed together.

Botanical Resource Value ratings for the study area are depicted in Figure 24, below. The plant communities having the most restrictive Botanical Resource Value ratings within the study area are wetlands, and late-seral forest in good condition . This is primarily due to the relatively high conservation rankings and decent ecological condition of these communities, but in some cases their restrictive Resource Value ratings were entirely due to wetland status.

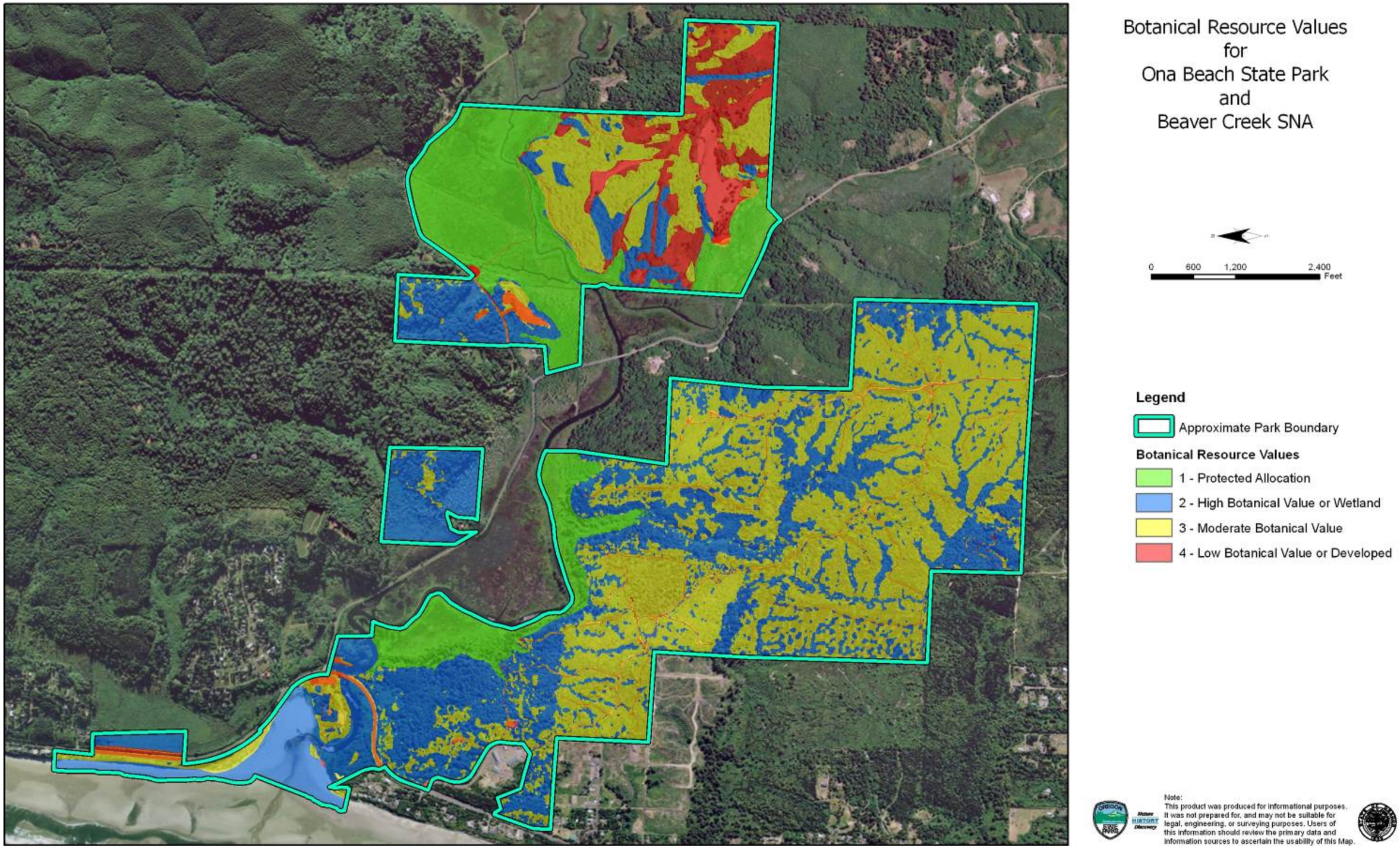
For the purposes of the readability of Figure 24 (due primarily to issues of scale), this map was prepared using only the aggregated Botanical Resource Value ratings of 1, 2, 3, and 4. The source data includes additional hybrid and contingency values of "2/3","2/4", "3(2)", "4(2)", "2/3(2)", etc. These are explained in the paragraph below.

The Botanical Resource Value hybrid ratings of "2/3" or "2/4" in the detailed GIS source data suggest a wider field of development and natural resource management options than the ratings 1,2,3, and 4. These hybrid ratings are used when wetlands are patchy and do not cover the full extent of the polygon. The fact that these hybrid Botanical Resource Value ratings contain the ratings of 3 or 4 indicates that wherever the polygon is not wetland, the overall plant community is not of high priority for conservation. Use of the hybrid rating implies the *potential* for careful siting of development within these zones and suggests that wetlands may be either avoidable or that areas of impact might be minimized to an extent that development might be allowed with permitting and mitigation, as required by the Department of State Lands and the US Army Corps of Engineers. Permitting and mitigation would require accurate mapping of wetlands within these upland/wetland mosaics. Accurate mapping entails formal delineation and survey of delineated wetland boundaries by professional surveyors. Delineation, permitting, and compensatory wetland mitigation would be expensive - from financial, time/staff commitment, and ecological perspectives. It should be considered a last resort. If permitting were to be pursued and on-site mitigation was required, a site for wetland creation or enhancement would have to be found within the property boundaries.

Botanical Resource Value hybrid ratings in the source GIS data with “(2)” in them indicate the value of the plant community/habitat if it were to be restored. These hybrid values are only assigned when the restoration of the target habitat is a priority and is feasible.

Botanical Resource Value hybrid ratings in the source GIS data with “(1)” in them indicate that the community occurs within a protected allocation.

Figure 24. Botanical Resource Value Ratings



Management Recommendations and Restoration Opportunities

(See Figure 25)

A) <u>General botanically-related land management recommendations:</u>

i) Control weeds along avenues of dispersal – roads, parking areas, ditches, trails, and streams. Weeds are currently growing and flourishing immediately adjacent to many of the study area's roads and trails – this encourages weed seed and propagule spread on socks, dogs, etc.

ii) Outside of weed control along avenues of dispersal, control weeds in areas that are in the best ecological condition and highest conservation ranking first in order to prevent their rapid deterioration. It is much easier to maintain than to restore.

iii) Control perimeters of existing infestations in the absence of sufficient manpower to attack the whole infestation. This strategy allows for control, but not eradication. Controlling spread is sometimes all that can be reasonably done with limited resources.

B) <u>Restoration opportunities</u>

1) ***Wet Meadow.*** Restoration of native wet meadow is a laborious and resource intensive process that should not be entered into lightly. It will need to be strategized according to feasibility and accessibility if it is to be implemented. There is more acreage in reed canarygrass wet meadow than will be feasibly restored without the use of water control structures. Standard estimates figure on at least $1000/acre with use of herbicides, and then annual or biannual weed control maintenance in perpetuity if a truly native wet meadow/marsh is the target. If weeds can be tolerated, installation cost should be comparable, but maintenance costs would be lower.

i) Remove weeds

(1) Weigh benefits and detriments of the palette of options available, including:

(a) Herbicides
(b) Tillage
(c) Flooding
(d) Burning

ii) Seed with grasses and other graminoids. Workhorse species include:

(a) tufted hairgrass
(b) slender hairgrass
(c) spike bentgrass
(d) American sloughgrass
(e) Creeping spikerush
(f) Soft rush
(g) Slough sedge
(h) Sitka sedge
(i) Water foxtail
(j) California oatgrass
(k) Various other sedges and rushes

iii) Introduce forbs either immediately after site preparation or when weed control allows

(a) Water parsley
(b) Epilobium densiflorum
(c) Epilobium watsonii
(d) Camas
(e) Downingia
(f) Potentilla anserina
(g) Geum macrophyllum
(h) Comarum palustre

iv) Prevent weed infestation
v) Consider planting shrubs in patches
(1) Redosier dogwood
(2) Hooker willow
(3) Black twinberry
(4) Pacific crabapple
(5) Douglas spiraea

2) ***Emergent marsh*** Restoration in this environment will be somewhat difficult without the ability to control and hold water levels for control of reed canarygrass through inundation. Areas of unvegetated mud are desirable from a habitat perspective, but are prone to recolonization by weeds.

i) Control invasives. Some areas may be controllable in driest part of season with manual, mechanical or chemical methods.
ii) Plant or seed emergent marsh species
(1) softstem bulrush
(2) cattail
(3) wapato
(4) water plantain
(5) small-fruited bulrush
(6) creeping spikerush
(7) bur-reed
(8) rushes
(9) sedges
(10) mannagrass
(11) Puccinellia
(12) tufted hairgrass
(13) American brooklime
(14) Skunk cabbage

3) ***Aquatic beds and floating/submerged plant communities*** These communities should ideally contain relatively high levels of unvegetated or sparsely vegetated soil. A complete canopy of vegetation is not desirable from a habitat standpoint, but if parrotfeather and other submerged aquatics are excessively dominant, shading and competition from native floating emergent plants may reduce their quantities.

i) Control weeds where feasible
ii) Plant desirable native plant species
(1) Yellow pond lily
(2) Floating pondweed
(3) Wapato

(4) Bur-reed
(5) Watershield

4) ***Invasive species management***
   i) Hedera helix
      (1) Ivy vines should be cut near bases of trees, with a space left so that vine cut ends don't reconnect.
      (2) Cut ends of vines can be painted, sprayed, or wiped with herbicide
      (3) Treatment of ground-twining ivy is more difficult
         (a) Manually: pull repeatedly.
         (b) Chemical: 4% glyphosate + 2% triclopyr amine + 2% Competitor (modified vegetable oil (MSO) surfactant.
         (c) Mechanical/manual + chemical: string trim, pull, or otherwise cut back ivy then apply herbicide to freshly unfurled replacement leaves. The older leaves are waxy and difficult to penetrate… the fresh leaves are less impermeable.
   ii) Armenian blackberry
      (1) Chemical control of blackberry should use either triclopyr amine with LI-700 in the spring, summer, or fall; or glyphosate with LI-700 in fall. If blackberry plants are large it is helpful to first cut back the plants and then to treat the regrowth at a cane length of approximately 18"-3'.
      (2) Small patches could be dug out, but care must be taken to remove all of the root.
      (3) Repetitive cutting is a method of managing blackberry, but does not kill it for a very long time.
   iii) Reed canarygrass
      (1) Manually or chemically control small reed canarygrass outliers in important natural habitats. Where substantial bare ground or disturbed soil results, seed or plant with appropriate native species. Chemical control should use glyphosate at 2% solution. Wicking/wiping may be the most appropriate method of chemical application since desirable native vegetation is often intermixed. Small patches could be dug out, but care must be taken to remove all rhizome fragments which is usually impracticable. Solarization through use of plastic sheeting or geotextile fabric may be effective on small patches.
   iv) Herb robert
      (1) Manually or chemically treat herb robert. Where substantial bare ground or disturbed soil results, seed or plant with appropriate native species. Control of herb robert can be done with triclopyr or glyphosate; triclopyr provides the advantage of not killing intermixed grasses. Hand pulling is still feasible as of 2011, but would require at least 8 person hours. The species is expected to spread quickly through the forest understory.

5) ***Forest management***
   i) Conifer forest
      (1) Consider thinning in overly-dense stands (with depauperate understories to encourage understory establishment and diversification, and to encourage forest structural diversity. Thinning will accelerate natural development towards later seral stages.
         (a) There is a paucity of downed wood in some of this habitat. Some of the thinned trees should be felled and left. Limbs should be lopped and scattered.

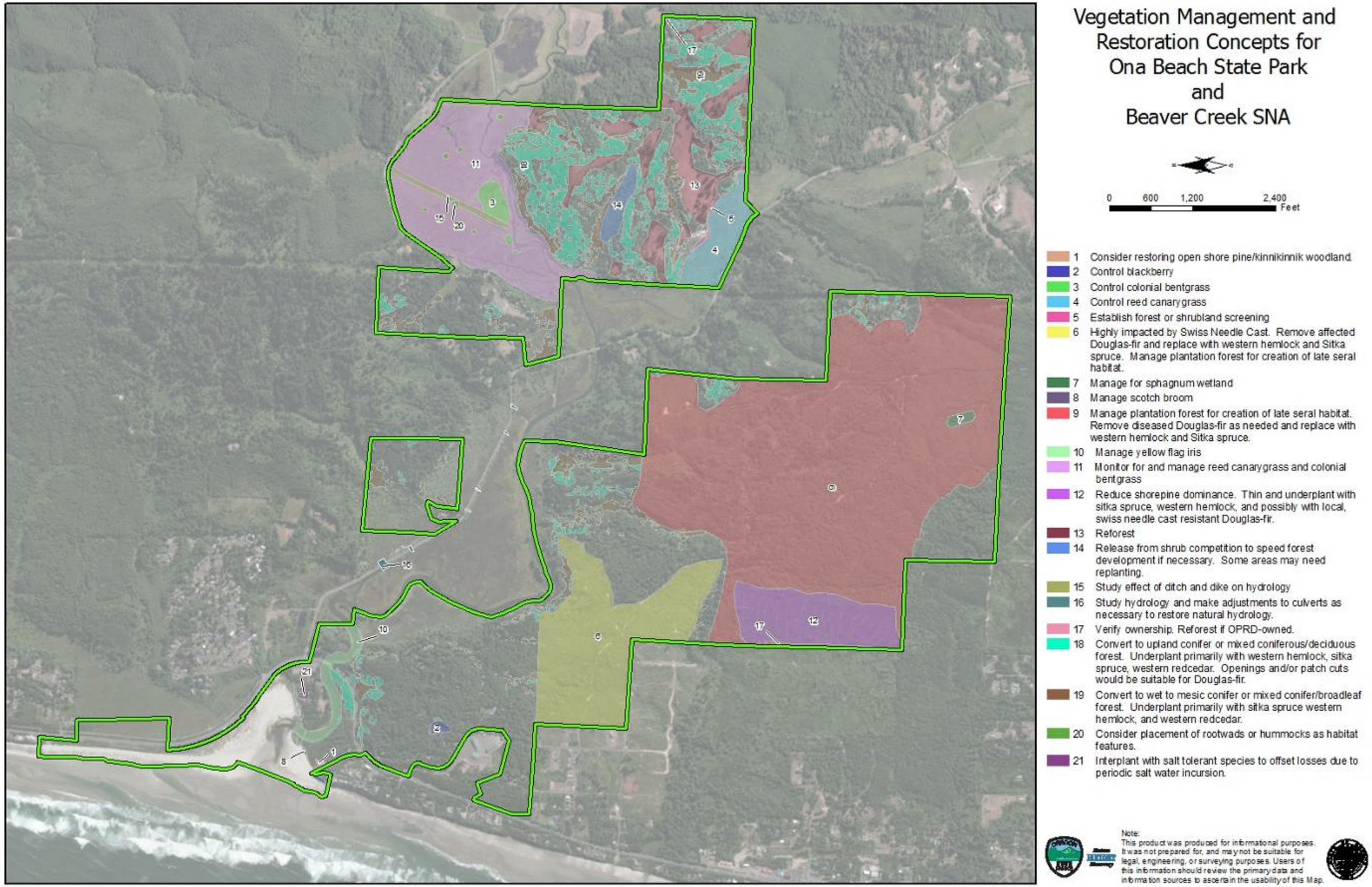
(2) Underplant with western hemlock, and western redcedar for structural and species diversity
    (a) Western redcedar and western hemlock should be planted from bareroot or containerized stock.
(3) Underplant depauperate stands with native shrubs and forbs
    (a) Red elderberry
    (b) Salal
    (c) salmonberry
    (d) Swordfern
    (e) Trailing blackberry
    (f) Siberian minerslettuce

ii) Mixed hardwood-conifer upland forest
    (1) Manage weeds
    (2) Underplant dense alder and cascara areas with additional shade-tolerant conifers such as western redcedar, western hemlock, and Sitka spruce.

6) Scrub-shrub wetland.
    i) Establish Hooker willow swamp in some areas currently dominated by reed canarygrass. It may be easier to take this approach and outcompete the reed canarygrass than to try to kill it directly with methods such as herbicide application, mechanical control, or solarization.
    ii) Plant banks of Beaver Marsh with wetland and riparian shrubs where upland grass or blackberry transitions directly to reed canarygrass or open water
        (1) Site preparation in grassy areas might be mulch, plastic sheeting, mowing
        (2) Site preparation in blackberry areas will be mowing followed by either geotextile fabric or herbicide treatment
        (3) Species to plant
            (a) Pacific crabapple
            (b) Hooker willow
            (c) Redosier dogwood
            (d) Douglas spiraea
            (e) Black twinberry
            (f) salmonberry

Figure 25. Restoration Priorities and Concepts

This figure shows broad areas that would be suitable for the restoration activities described in "Management Recommendations and Restoration Opportunities", above. The figure is not meant to imply that all of the area depicted should in fact be restored. This will be a management decision beyond the scope of this assessment. The recommendations depicted here are related to vegetation ecology, and do not incorporate all wildlife, scenic, or forestry concerns and considerations.



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Appendix 1: Preliminary Vascular Plant Species List for the Beaver Creek/Ona Beach Study Area

The following list compiles those species observed in the course of fieldwork. Due to the timing of the surveys, a number of spring and late summer plants may not have been visible or identifiable at the time of the survey, and as such this list is almost certainly incomplete. It is not meant to be exhaustive or to cover the portions of the park that were inundated at the time of survey.

Scientific Name	Common Name	Code
Abronia latifolia	yellow sandverbena	ABRLAT
Acer circinatum	vine maple	ACECIR
Achillea millefolium	common yarrow	ACHMIL
*Agrostis capillaries**	colonial bentgrass	AGRCAP
Agrostis sp.*	bentgrass	Agrostis sp
*Agrostis stolonifera**	creeping bentgrass	AGRSTO
*Aira caryophyllea**	silver hairgrass	AIRCAR
*Aira praecox**	yellow hairgrass	AIRPRA
Alnus rubra	red alder	ALNRUB
Alopecurus geniculatus	water foxtail	ALOGEN
*Ammophila arenaria**	European bess	AMMARE
*Anagalis arvensis**	poor man's weatherglass	ANAARV
Anaphalis margaritacea	western pearly everlasting	ANAMAR
Angelica hendersonii	Henderson's angelica	ANGHEN
Angelica lucida	seacoast angelica	ANGLUC
*Anthoxanthum odoratum**	sweet vernalgrass	ANTODO
Arceuthobium tsugense	hemlock dwarf mistletoe	ARCTSU
Arctostaphylos columbiana	hairy manzanita	ARCCOL
Arctostaphylos uva-ursi	kinnikinnick	ARCUVA
Argentina egedii	Pacific silverweed	ARGEGE
Aster sp.	Aster	ASTER
Aster subspicatus	Douglas' aster	ASTSUB
Athyrium filix-femina	common ladyfern	ATHFIL
Barbarea orthoceras	American yellowrocket	BARORT
*Bellis perennis**	lawndaisy	BELPER
Berberis aquifolium	tall oregongrape	BERAQU
*Betula sp.**	birch	BETULA sp
Blechnum spicant	deer fern	BLESPI
Boykinia elata	coastal brookfoam	BOYELA
*Briza minor**	little quakinggrass	BRIMIN
*Bromus mollis**	soft chess	BROMOL
*Bromus rigidus**	ripgut brome	BRORIG
Bromus sitchensis	Sitka brome	BROSIT
Cakile edentula	American searocket	CAKEDE
*Cakile maritime**	European searocket	CAKMAR
Calamagrostis nutkaensis	Nootka reedgrass	CALNUT

Scientific Name	Common Name	Code
Callitriche sp	water-starwort	CALLITRICHE
Callitriche stagnalis	pond water-starwort	CALLITRICHE STAG
*Capsella bursa-pastoris**	shepherds purse	CARBUR
Cardamine sp.(pulcherima-like)	bittercress(pulcherima-like)	cardamine sp (pulchoid)
Cardionema ramossisimum	spiny sandmat	CARDRAMO
Carex aquatilis var. dives	Sitka sedge	CARAQUDIV
Carex deweyana	Dewey sedge	CARDEW
Carex lyngbyei	Lyngbye's sedge	CARLYN
*Carex macrocephala/kobomugi**	large-headed sedge/Japanese sedge	CARMACKOM
Carex obnupta	slough sedge	CAROBN
Carex pansa	sand dune sedge	CARPAN
Carex sp.	sedge	CAREX SP
Carex stipata	awlfruit sedge	CARSTI
Castilleja tenuis	hairy owlclover	CASTEN
Cerastium arvense	field chickweed	CERARV
*Cerastium vulgatum**	mouse-ear chickweed	CERVUL
Chrysosplenium glechomifolium	Pacific golden saxifrage/watercarpet	CHRGLE
Cicuta douglasii	western water hemlock	CICDOU
Cinna latifolia	drooping woodreed	CINLAT
*Cirsium arvense**	Canada thistle	CIRARV
Cirsium edule	edible thistle	CIREDU
*Cirsium vulgare**[B]	bull thistle	CIRVUL
Claytonia sibirica	Siberian springbeauty	CLASIB
Comarum palustre	purple marshlocks	COMPAL
Convulvulus soldanella	beach morningglory	CONVULVULUS soldanella
*Cotula coronopifolia**	brass buttons	COTULA
*Crepis (capillaris)**	hawksbeard (capillaris)	crepis (capillaris)
*Cytisus scoparius**[B]	Scotch broom	CYTSCO
*Dactylis glomerata**	orchardgrass	DACGLO
Danthonia californica	California oatgrass	DANCAL
Deschampsia caespitosa	tufted hairgrass	DESCAE
Dicentra formosa	Pacific bleeding heart	DICFOR
*Digitalis purpurea**	purple foxglove	DIGPUR
Disporum smithii	Smith's fairybells	DISSMI
Dryopteris expansa	spreading woodfern	DRYEXP
Eleocharis palustris	common spikerush	ELEPAL
Epilobium angustifolia	fireweed	EPIANG
Epilobium watsonii	Watson's willowherb	EPIWAT
Equisetum arvense	field horsetail	EQUARV
Equisetum telmateia	giant horsetail	EQUTEL
*Erechtites minima**	coastal burnweed	EREMIN
*Festuca (rubra)**	(red) fescue	FESTUCA CF RUBRA
*Festuca arundinacea**	tall fescue	FESARU

Scientific Name	Common Name	Code
Festuca sp.	fescue	FESTUCA SP
Festuca subulata	bearded fescue	FESSUBULATA
Fragaria chiloensis	beach strawberry	FRACHI
*Galium aparine**	cleavers	GALAPA
Galium trifidum ssp. columbianum	threepetal bedstraw	GALTRICOL
Galium triflorum	sweet-scented bedstraw	GALTRI
Gaultheria shallon	salal	GAUSHA
Gentiana sceptrum	king's scepter gentian	GENSCE
*Geranium dissectum**	cutleaf geranium	GERDIS
*Geranium molle**	dovefoot geranium	GERMOL
*Geranium robertianum**[B]	herb robert	GERROB
Glehnia littoralis	American silvertop	GLELIT
Glyceria borealis	small floating mannagrass	GLYBOR
Glyceria elata	tall mannagrass	GLYELA
*Hebe sp.**	hebe	Hebe sp
*Hedera helix**[B]	English ivy	HEDHEL
Hemitomes congestum	gnome plant	HEMCON
Heracleum lanatum	cowparsnip	HERLAN
Hieracium albiflorum	white hawkweed	HIEALB
*Holcus lanatus**	common velvetgrass	HOLLAN
Holodiscus discolor	oceanspray	HOLDIS
Honckenia peploides	sea sandwort	HONPER
Hypericum anagalloides	bog saint john's wort	HYPANA
*Hypericum perforatum**[B]	Saint johnswort	HYPPER
*Hypochaeris radicata**	hairy cat's ear	HYPRAD
*Ilex aquifolium**	English holly	ILEAQU
*Iris pseudacorus**[B]	yellowflag iris	IRIPSE
Iris tenax?	toughleaf iris?	IRTEN?
Juncus balticus	baltic rush	JUNBAL
Juncus bufonius	toad rush	JUNBUF
Juncus effusus	common rush	JUNEFF
Juncus ensifolius	swordleaf rush	JUNENS
Juncus falcatus	falcate rush	JUNFAL
Juncus lesueurii	salt rush	JUNLES
Juncus sp.	rush	JUNCUS SP.
Juncus tenuis	poverty rush	JUNTEN
JUNFLATCAP	JUNFLATCAP	JUNFLATCAP
*Lapsana communis**	common nipplewort	LAPCOM
Lathyrus japonicus	beach pea	LATJAP
Lathyrus littoralis	silky beach pea	LATLIT
Lathyrus palustris	marsh pea	LATHPALU
Ledum palustre	trapper's tea	LEDPAL
Leontodon taraxacoides	lesser hawkbit	LEOTAR
Leymus mollis	American dunegrass	LEYMOL

Scientific Name	Common Name	Code
Lilaeopsis occidentalis	western lilaeopsis	LILOCC
*Lolium multiflorum**	annual ryegrass	LOLMUL
*Lolium perenne**	perennial ryegrass	LOLPER
Lonicera involucrata	black twinberry	LONINV
*Lotus corniculatus**	bird's-foot trefoil	LOTCOR
Lotus crassifolius	big deervetch	LOTCRA
*Ludwigia palustris**	marsh seedbox	LUDPAL
Lupinus arboreus	yellow bush lupine	LUPARB
Lupinus littoralis	seashore lupine	LUPLIT
Lupinus rivularis	riverbank lupine	LUPRIV
Luzula parviflora	smallflowered woodrush	LUZPAR
Luzula sp.	woodrush	Luzula sp.
Lycopus americanus	American water horehound	lycopus amer
Lysichiton americanus	American skunkcabbage	LYSAME
Maianthemum dilatatum	false lily of the valley	MAIDIL
Malus fusca	Oregon crab apple	MALFUS
Marah oreganus	coastal manroot	MARORE
*Matricaria discoidea**	pineapple weed	MATRICARIA
*Medicago lupulina**	black medick	MEDLUP
Mentha arvensis	wild mint	MENARV
Menziesia ferruginea	fool's huckleberry	MENFER
Mimulus dentatus	coastal monkeyflower	MIMDEN
Mimulus moschatus	musk monkeyflower	MIMMOS
Mitella ovalis	coastal miterwort	MITOVA
Montia parviflora var. flagellaris	littleleaf minerslettuce	MONPARFLA
Montia sibirica	Siberian springbeauty	MONSIB
Myosotis laxa	bay forget-me-not	MYOLAX
Myosotis micrantha	small flowered forget-me-not	MYOMIC
Myosotis scorpioides	true forget-me-not	MYOSCO
Myrica californica	California waxmyrtle	MYRCAL
Nuphar polysepala	yellow pondlily	NUPPOL
Oenanthe sarmentosa	water parsley	OENSAR
*Oenothera glazioviana**	redsepal evening primrose	OENGLA
Oxalis oregana	redwood-sorrel	OXAORE
Oxalis sp.	woodsorrel	Oxalis sp.
*Parentucellia viscosa**	yellow glandweed	PARVIS
*Phalaris arundinacea**	reed canarygrass	PHAARU
Picea sitchensis	Sitka spruce	PICSIT
Pinus contorta var. contorta	shore pine	PINCON
*Pinus pinaster**	maritime pine	PINPIN
*Plantago lanceolata**	narrowleaf plantain	PLALAN
*Plantago major**	common plantain	PLAMAJ
*Poa annua**	annual bluegrass	POAANN
*Poa compressa**	Canada bluegrass	POACOM

Scientific Name	Common Name	Code
Poa confinis/unilateralis	Poa confinis/unilateralis	POA CONFUNIL
*Poa palustris**	fowl bluegrass	POAPAL
*Poa pratensis**	Kentucky bluegrass	POAPRA
Poa sp.	bluegrass	POA SP
*Poa trivialis**	rough bluegrass	POATRI
Poa unilateralis	San Francisco bluegrass	POAUNILAT
*Polygonum aviculare**	prostrate knotweed	POLAVI
*Polygonum persicaria**	spotted ladysthumb	POLPER
Polypodium glycyrrhiza	licorice fern	POLGLY
Polypodium scouleri	leathery polypody	POLSCO
*Polypogon monspeliensis**	annual rabbitsfoot grass	POLMON
Polystichum munitum	western swordfern	POLMUN
Potamogeton natans	floating pondweed	POTNAT
Potentilla anserina	Pacific silverweed	POTANS
Prosartes smithii	Smith's fairybells	PROSMI
Prunella vulgaris	common selfheal	PRUVUL
*Prunus sp.**	cherry/plum	Prunus sp
Pseudotsuga menziesii	Douglas-fir	PSEMEN
Pteridium aquilinum	western brackenfern	PTEAQU
Puccinellia pauciflora	pale false mannagrass	PUCPAU
*Ranunculus repens**	creeping buttercup	RANREP
Rhamnus purshiana	cascara	RHAPUR
Rhododendron macrophyllum	Pacific rhododendron	RHOMAC
Ribes bracteosum	stink currant	RIBBRA
*Robinia/Gleditsia sp.**	locust	Robinia
Rorippa curvipes	bluntleaf yellowcress	RORCUR
Rosa nutkana	Nootka rose	ROSNUT
*Rosa sp.(introd)**	rose(introd)	Rosa sp (introd)
*Rubus armeniacus**[B]	Himalaya blackberry	RUBARM
*Rubus laciniatus**	cutleaf blackberry	RUBLAC
Rubus parviflorus	thimbleberry	RUBPAR
Rubus spectabilis	salmonberry	RUBSPE
Rubus ursinus	trailing blackberry	RUBURS
*Rumex acetosella**	sheepsorrel	RUMACE
*Rumex crispus**	curley dock	RUMCRI
Rumex maritimus	golden dock	RUMMAR
Rumex occidentalis	western dock	RUMOCC
Rumex occidentalis/obtusifolius	western/bitter dock	RUMOCCOBT
Salix hookeriana	Hooker willow	SALHOO
Salix lasiandra	Pacific willow	SALLAS
Salix scouleriana	Scouler's willow	SALSCO
Sambucus racemosa	red elderberry	SAMRAC
Schoenoplectus acutus	hardstem bulrush	SCHACU
Schoenoplectus americanus	threesquare bulrush	SCHAME

Scientific Name	Common Name	Code
Scirpus micranthus	small-fruited bulrush	SCIMIC
Scrophularia californica	California figwort	SCRCAL
*Senecio jacobea** [B]	Tansy ragwort	SENJAC
*Senecio sylvaticus**	woodland ragwort	SENSYL
*Senecio vulgaris**	common groundsel	SENVUL
*Sherardia arvensis**	blue madder	SHEARV
Sisrynchium angustifolia	sisang	SISANG
*Sisymbrium officinale**	hedgemustard	SISOFF
*Solanum dulcamara**	bittersweet nightshade	SOLDUL
*Solanum nigrum**	black nightshade	SOLNIG
*Soliva sessilis**	field burrweed	SOLSES
*Sonchus asper**	spiny sowthistle	SONASP
*Sonchus oleraceus**	common sowthistle	SONOLE
Sparganium sp.	bur-reed	SPARGANIUM
*Spergularia villosa**	spergularia villosa	SPEVIS
Spiraea douglasii	rose spirea, douglas spiraea, hardhack	SPIDOU
Stachys mexicana	Mexican hedgenettle	STAMEX
*Stellaria graminea**	grass-like starwort	STEGRA
*Stellaria media**	common chickweed	STEMED
Streptopus amplexifolius	claspleaf twistedstalk	STRAMP
Tanacetum camphoratum	dune tansy	TANCAM
*Taraxacum officinale**	common dandelion	TAROFF
Taxus brevifolia	Pacific yew	TAXBRE
Tellima grandiflora	bigflower tellima	TELGRA
Thuja plicata	western redcedar	THUPLI
Tiarella trifoliata	threeleaf foamflower	TIATRI
Tolmiea menziesii	youth on age	TOLMEN
*Trifolium dubium**	suckling clover	TRIDUB
*Trifolium pretense**	red clover	TRIPRA
*Trifolium repens**	white clover	TRIREP
Trifolium sp.	clover	TRIFOLIUM
*Trifolium subterraneum**	subterranean clover	TRISUB
Trifolium wormskioldii	cows clover	TRIWOR
Triglochin maritima	seaside arrowgrass	TRIMAR
Trisetum cernuum	nodding trisetum	TRICER
Tsuga heterophylla	western hemlock	TSUHET
Typha latifolia	broadleaf cattail	TYPLAT
Urtica dioica	stinging nettle	URTDIO
Vaccinium ovatum	evergreen huckleberry	VACOVA
Vaccinium parvifolium	red huckleberry	VACPAR
Veronica americana	American speedwell, Am. Brooklime	VERAME
*Veronica chamaedrys**	germander speedwell	VERCHA
Veronica serpyllifolia	thymeleaf speedwell	VERSER

Scientific Name	Common Name	Code
Vicia gigantea	giant vetch	VICGIG
*Vicia sativa**	garden vetch	VICSAT
Viola adunca	early blue violet	VIOADU
Viola glabella	pioneer violet	VIOGLA
Viola sempervirens	evergreen violet	VIOSEM
Viola sp.	violet	Viola sp
*Vulpia bromoides**	brome fescue	VULBRO
*Vulpia sp.**	annual fescue	VULPIA

*: non-native species
[B]: Oregon Department of Agriculture "B" list noxious weed species.

89 of 261 species are non-native (34%). One of the species counted as native may be at least partially represented by non-native varieties or subspecies of the species.

8 of the non-native species are the Oregon Department of Agriculture's "B" list of noxious weeds (not including *Equisetum telmateia* var. *braunii*, which is actually native)

Appendix 2. Potential At-Risk Plant Species. ORBIC list 1-4, State or Federally-listed, candidate, or SOC[1] species known to occur in the Coast Range Ecoregion of Lincoln, Lane, and Tillamook Counties, Oregon.

Scientific Name	Common Name	Federal Status	State Status	Heritage List
Abronia latifolia	Yellow sandverbena			4
Abronia umbellata ssp. breviflora	Pink sandverbena	SOC	LE	1
Albatrellus caeruleoporus	Fungus			3
Amanita novinupta	Fungus			3
Anemone oregana var. felix	Bog anemone	SOC		2
Arcangeliella camphorata	Fungus			1
Astragalus umbraticus	Woodland milk-vetch			4
Atriplex gmelinii var. gmelinii	Gmelin's saltbush			2
Atriplex leucophylla	Beach saltbush			3
Blepharostoma arachnoideum	Liverwort			2
Boletus pulcherrimus	Fungus			1
Bryoria bicolor	Lichen			3
Bryoria pseudocapillaris	Lichen			4
Bryoria subcana	Lichen			2
Buxbaumia aphylla	Moss			3
Calicium abietinum	Lichen			4
Callitriche hermaphroditica	Northern water-starwort			3
Calypogeia sphagnicola	Liverwort			2
Campylopus schmidii	Moss			2
Cardamine pattersonii	Saddle Mt. bittercress	SOC	C	1
Carex brevicaulis	Short-stemmed sedge			2
Carex gynodynama	Hairy sedge			4
Carex livida	Pale sedge			2
Carex macrocephala	Bighead sedge			2
Catathelasma ventricosum	Fungus			3
Cephaloziella spinigera	Liverwort			2
Ceratophyllum echinatum	Prickly hornwort			2-ex
Chamonixia caespitosa	Fungus			2
Chrysomphalina grossula	Fungus			3
Cicendia quadrangularis	Timwort			2
Cimicifuga elata var. elata	Tall bugbane		C	4
Cladidium bolanderi	Lichen			2
Clavulina castaneopes var. lignicola	Fungus			3

Scientific Name	Common Name	Federal Status	State Status	Heritage List
Clitocybe senilis	Fungus			3
Codriophorus ryszardii	Moss			3
Cordyceps ophioglossoides	Fungus			3
Cortinarius depauperatus	Fungus			3
Cortinarius valgus	Fungus			3
Cyperus bipartitus	Shining cyperus			3
Cystangium idahoensis	Fungus			1
Darlingtonia californica	California pitcher-plant			4
Delphinium oreganum	Willamette Valley larkspur	SOC	C	1
Delphinium pavonaceum	Peacock larkspur	SOC	LE	1
Dendrocollybia racemosa	Fungus			3
Diplophyllum plicatum	Liverwort			3
Dodecatheon austrofrigidum	Frigid shootingstar	SOC		1
Douglasia laevigata	Smooth-leaved douglasia			3
Elaphomyces decipiens	Fungus			3
Elymus glaucus ssp. virescens	Smooth wildrye			3
Endogone oregonensis	Fungus			3
Enemion stipitatum	Dwarf isopyrum			4
Erigeron peregrinus var. peregrinus	Wandering daisy			2
Erioderma sorediatum	Lichen			2
Eriophorum chamissonis	Russet cotton-grass			2
Erythronium elegans	Coast Range fawn-lily	SOC	LT	1
Erythronium revolutum	Pink fawn-lily			4
Eucladium verticillatum	Moss			3
Filipendula occidentalis	Queen-of-the-forest	SOC	C	1
Fritillaria camschatcensis	Indian rice			2
Gastroboletus ruber	Fungus			3
Gilia millefoliata	Seaside gilia	SOC		1
Gnaphalium californicum	California cudweed			3
Gomphus kauffmanii	Fungus			3
Grimmia anomala	Moss			3
Haplomitrium hookeri	Liverwort			2
Helvella elastica	Fungus			3
Heterodermia japonica	Lichen			2
Heterodermia leucomela	Lichen			2
Heterodermia sitchensis	Lichen			2
Hierochloe odorata	Holy grass			4
Hydropus marginellus	Fungus			3

Scientific Name	Common Name	Federal Status	State Status	Heritage List
Hypogymnia duplicata	Lichen			3
Hypogymnia pulverata	Lichen			2
Hypogymnia subphysodes	Lichen			2
Hypotrachyna revoluta	Lichen			2
Lathyrus holochlorus	Thin-leaved peavine	SOC		1
Lecanora caesiorubella ssp. merrillii	Lichen			3
Leioderma sorediatum	Lichen			2
Leptogium cyanescens	Lichen			2
Leptogium platynum	Lichen			3
Leucogaster microsporus	Fungus			4
Lewisia columbiana var. rupicola	Rosy lewisia			2
Lilaea scilloides	Flowering quillwort			4
Limbella fryei	Moss	SOC	C	1
Lophozia laxa	Liverwort			2
Lycopodiella inundata	Northern bog clubmoss			2
Macowanites chlorinosmus	Fungus			3
Marsilea vestita	Hairy water-fern			3
Metzgeria violacea	Liverwort			2
Microseris bigelovii	Coast microseris			2
Montia howellii	Howell's montia		C	4
Mycena tenax	Fungus			3
Myrica gale	Sweet gale			3
Myriophyllum sibiricum	Common water-milfoil			4
Niebla cephalota	Lichen			2
Nolanea edulis var. concentrica	Fungus			3
Ophioglossum pusillum	Adder's-tongue			2
Packera flettii	Flett's groundsel			2
Pannaria rubiginosa	Lichen			2
Pellaea andromedifolia	Coffee fern			2
Persicaria punctata	Dotted smartweed			3
Phacelia verna	Spring phacelia			4
Phaeocollybia californica	Fungus			1
Phaeocollybia dissiliens	Fungus			3
Phaeocollybia gregaria	Fungus			1
Phaeocollybia lilacifolia	Fungus			3
Phaeocollybia pseudofestiva	Fungus			3
Phaeocollybia radicata	Fungus			3
Pilophorus nigricaulis	Lichen			2

Scientific Name	Common Name	Federal Status	State Status	Heritage List
Piperia candida	White piperia			3
Piperia elongata	Dense-flower rein orchid			3
Plagiothecium cavifolium				3
Plagiothecium piliferum	Moss			3
Plantago macrocarpa	North pacific plantain			2
Poa laxiflora	Loose-flowered bluegrass			4
Poa marcida	Weak bluegrass			4
Poa stenantha	Narrow-flower bluegrass			3
Poa unilateralis	San Francisco bluegrass	SOC		2
Podostroma alutaceum	Fungus			3
Pohlia sphagnicola	Moss			2
Polypodium calirhiza	Hotroot polypody			3
Polystichum californicum	California sword-fern			2
Potamogeton praelongus	White-stem pondweed			3
Potamogeton pusillus ssp. tenuissimus	Slender pondweed			3
Potamogeton robbinsii	Flatleaf pondweed			3
Pseudaleuria quinaultiana	Fungus			3
Pseudocyphellaria mallota	Lichen			2
Pseudocyphellaria perpetua	Lichen			4
Pseudocyphellaria rainierensis	Lichen			4
Pseudorhizina californica	Fungus			2
Pyrrhospora quernea	Lichen			4
Radiigera bushnellii	Fungus			3
Ramalina pollinaria	Lichen			2
Ramaria abietina	Fungus			3
Ramaria aurantiisiccescens	Fungus			4
Ramaria conjunctipes var. sparsiramosa	Fungus			3
Ramaria rubella var. blanda	Fungus			2
Rhinanthus crista-galli	Yellow rattle			4
Rhizopogon clavitisporus	Fungus			2
Rhizopogon exiguus	Fungus			2
Rhizopogon semireticulatus	Fungus			3
Rhynchospora alba	White beakrush			2
Rhytidiadelphus subpinnatus	Moss			3
Ribes divaricatum var. pubiflorum	Straggly gooseberry			2
Ribes laxiflorum	Trailing blackberry			3
Rickenella swartzii	Fungus			3

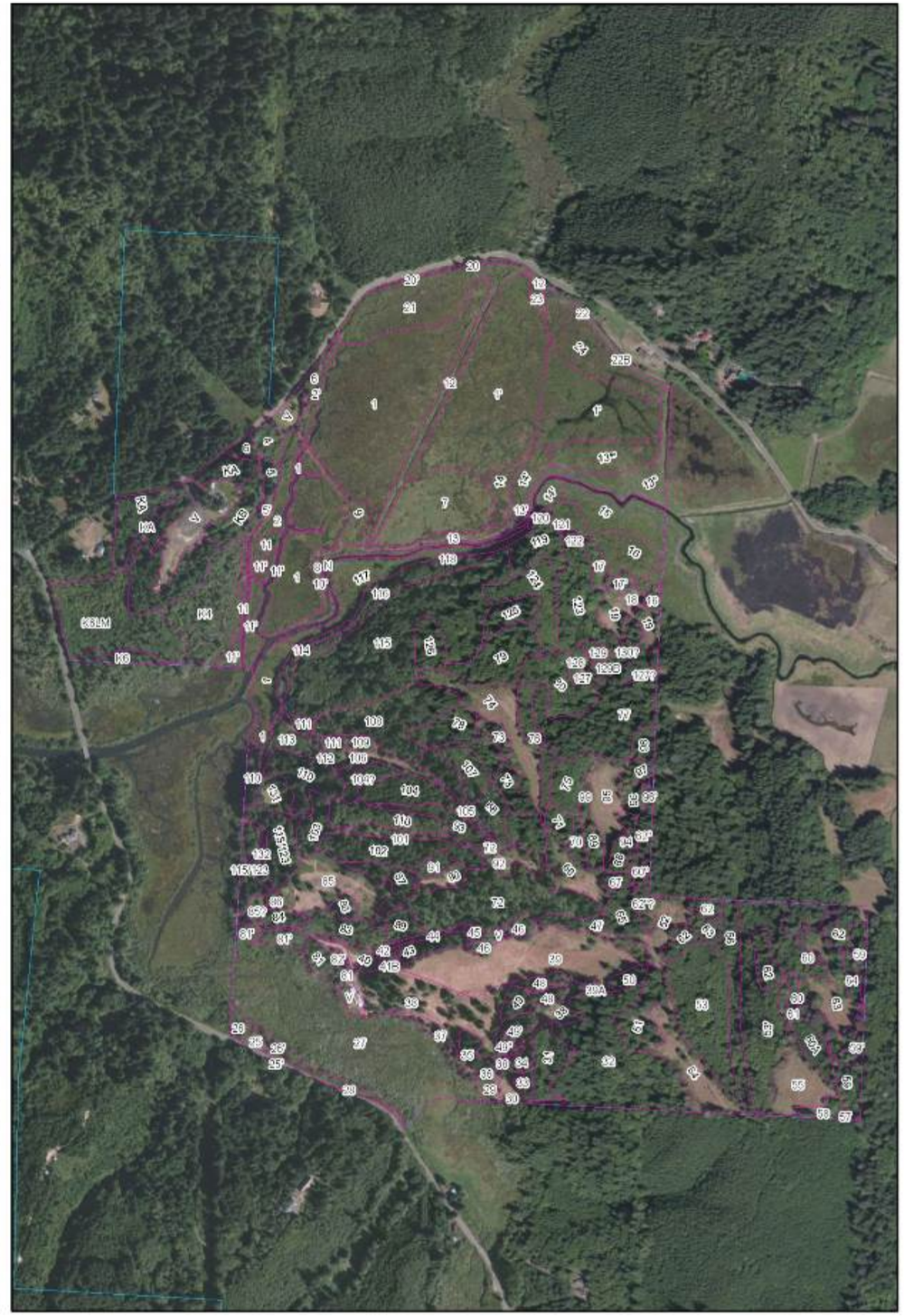
Scientific Name	Common Name	Federal Status	State Status	Heritage List
Romanzoffia thompsonii	Thompson mistmaiden			1
Sarcodon fuscoindicus	Fungus			3
Saxifraga hitchcockiana	Saddle Mt. saxifrage	SOC	C	1
Schistostega pennata	Moss			2
Schoenoplectus subterminalis	Water clubrush			2
Sidalcea campestris	Meadow checker-mallow		C	4
Sidalcea hendersonii	Henderson's sidalcea	SOC		1
Sidalcea hirtipes	Bristly-stemmed sidalcea	SOC	C	1
Sidalcea nelsoniana	Nelson's sidalcea	LT	LT	1
Silene douglasii var. oraria	Cascade Head catchfly	SOC	LT	1
Stenocybe clavata	Lichen			4
Stenocybe major	Lichen			4
Stropharia albovelata	Fungus			3
Sulcaria badia	Lichen			4
Synthyris schizantha	Fringed kittentail			4
Tayloria serrata	Moss			4
Teloschistes flavicans	Lichen			2
Tetraphis geniculata	Moss			2
Tetraplodon mnioides	Moss			4
Thaxterogaster pavelekii	Fungus			1
Thelomma mammosum	Lichen			3
Tortella fragilis	Moss			3
Trichostomum tenuirostre var. tenuirostre	Moss			3
Triglochin striata	Three-ribbed arrow-grass			3
Tuber asa	Fungus			3
Tuber pacificum	Fungus			3
Usnea nidulans	Lichen			2
Usnea rubicunda	Lichen			3
Usnea subgracilis	Lichen			4
Utricularia gibba	Humped bladderwort			2
Utricularia minor	Lesser bladderwort			2
Vaccinium oxycoccos	Wild bog cranberry			4
Vibrissea truncorum	Fungus			3
Viola langsdorfii	Aleutian viola			3

1. LE = “Listed endangered”; LT = “Listed threatened”; C = “Candidate”; SOC = “species of concern”
2. The Blue Mountains Basins ecoregion is an ecological zone mapped by the Oregon Biodiversity Information Center in cooperation with The United States Environmental Protection Agency, the US Forest Service, the US Natural Resources Conservation Service, and United States Geological Survey. Wapato Access Willamette River Greenway is entirely within the Blue Mountains Basins ecoregion.

3. ORBIC tracks rare species in lists ranging from 1 to 4. List 1 contains species that are endangered or threatened throughout their range. List 2 contains species which are endangered or threatened in Oregon, but that are more common elsewhere. List 3 contains species which may be endangered or threatened, but more information is needed to determine their true rarity. List 4 contains species that are rare or declining, but not currently endangered or threatened.

This information was gathered through tabular data query of the 2010 ORBIC publication, "Rare, Threatened, and Endangered Species of Oregon".

Appendix 3. Detailed Mapping of Plant Communities



Detailed/Field-Mapped Vegetation
of
Ona Beach State Park
and
Beaver Creek SNA

0 400 800 1,600
Feet

Note:
This product was produced for informational purposes. It was not prepared for, and may not be suitable for legal, engineering, or surveying purposes. Users of this information should review the primary data and information sources to ascertain the usability of this Map.

Appendix 3B. Description of Detailed Plant Communities Mapped in Appendix 3.

The information presented below corresponds to the mapcodes that label the polygons in the figure shown in Appendix 3. This information is largely raw, field-collected vegetation composition data in field shorthand codes. The vegetation is reported in terms of plant species codes (which are made up a concatenation of the first 3 letters of genus and the first 3 letters of species. The plant community structural notation is as follows: "/" denotes a change in canopy level, "-" separates species co-occurring in a canopy level. Items in parenthese "( )" are patchy or sparse. When more than one unmappable distinct plant community type occurs within the overall map polygon, the distinct communities or canopy layers that compose the mosaic community are denote by square brackets "[ ]". Comments on the polygon follow plant community composition codes. Equivalent published and ranked plant communities that make up part of the polygon's mosaic community are listed under "Equivalents". The conservation rankings of these communities are listed under " Ranks". These ranks are defined as follows:

> ***Rank*** *is a code identifying the conservation status of the plant association. It is composed of a global rank ("G") followed by a state rank ("S"). 1 = Critically imperiled because of extreme rarity, with 5 or fewer occurrences or very few remaining acres. 2 = Imperiled because of rarity, with 6-20 occurrences or few remaining acres. 3 = Either very rare and local throughout its range or found locally in a restricted range; uncommon, with 21-100 occurrences. 4 =Apparently secure, though it may be quite rare in parts of its range, especially at the periphery; many occurrences. 5 = Demonstrably secure, though it may be quite rare in parts of its range, especially at the periphery; ineradicable under present conditions. These standardized ranks are used by all natural heritage programs and conservation data centers throughout North America. They are based on the best available information.*

1 (SPIDOU)(SALHOO)(LONINV)/[CAROBN-ARGEGE(-ELEPAL)(-JUNEFF)][ELEPAL-ALOGEN(-ARGEGE)(-CALLITRICHE)][TYPLAT-ELEPAL(-CAROBN)(-JUNEFF)(-PHAARU)][CARAQU-CAROBN-ELEPAL-ARGEGE(-JUNEFF)(-CICDOU)((-PHAARU)][SCHACU-CAROBN][PHAARU-SCIMIC-CAROBN-ARGEGE]
PHAR, coronopus, Agrostis capillaris are the principal weeds in the middle of the areas coded as polky 1. LOTCOR, HOLLAN, TRIREP, etc are more common along cattle drive road, especially near old coral (now parking).
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL; SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO / (ARGEGE) - CAROBN; SCHACU; SCIMIC; SPIDOU; TYPLAT;
Ranks: G4S4; G4S4; G5S5; G3S3; G4S4; G5S5; G4S4; G5S4; G5S5;

1' CAROBN-ELEPAL-LYSAME-ARGEGE-PHAARU
LITTLE CAAQ. NO SCAC.
Equivalents: CAROBN - ARGEGE; ELEPAL;
Ranks: G4S4; G5S5;

2 SPIDOU-LONINV(-MALFUS)/[PHAARU-CAROBN][SCIMIC-CAROBN-CICDOU-ARGEGE-LYSAME(-PHAARU)]
MOSTLY SPDO W/ SUBSTANTIAL PHAR COMP. LONINV AND MAFU RELATIVELY SPARSE. CAOB NOT EASILY VISIBLE. COMMUNITY CENTERED ON DITCH AND SEPARATED FROM 2' BY CULVERT.

Equivalents: SALHOO - (MALFUS) / CAROBN - LYSAME; SALHOO / (ARGEGE) - CAROBN; SPIDOU;
Ranks: G3S2; G4S4; G5S4;

2' SPIDOU-LONINV(-MALFUS)(-SALHOO)/PHAARU-CAROBN-ARGEGE-JUNEFF(-LYSAME)(-GALCYM)
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME; SALHOO / (ARGEGE) - CAROBN; SPIDOU;
Ranks: G3S3; G3S2; G4S4; G5S4;

4 SALHOO(-SPIDOU)(-MALFUS)(-LONINV)/LYSAME-OENSAR-CAROBN-ATHFIL(-PHAARU)
CONDITION GRADING TO P AT MARSH EDGE AND AT ROAD EDGE DUE TO PHAR.
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME;

5 PICSIT(-THUPLI)/RUBSPE-GAUSHA(-VACPAR)(MALFUS-RHAPUR)
EDGE OF WETLAND IS RHPU-MAFU/SPDO/PHAR (S-M TO P).
Equivalents: PICSIT / GAUSHA - RUBSPE
Ranks: G3S3

5' ALNRUB/SAMRAC(-LONINV)(-SPIDOU)/PHAARU-POLMUN
Equivalents: NONE
Ranks: NONE
Ranks: G3S3; G3S2;

6 [PICSIT-ALNRUB/RUBSPE-SPIDOU/CAROBN-LYSAME-OENSAR(-PHAARU)(-RANREP)] [PICSIT-ALNRUB/LONINV-SPIDOU(-RUBSPE)/PHAARU(-CAROBN)(-LYSAME)] [ALNRUB-PICSIT/LONINV-SPIDOU-SALHOO/PHAARU-LYSAME]
RUDI, POA, GASH, RUUR, POMU, ANTODO COMMON IN UPLAND PORTIONS.
Equivalents: tALNRUB / ATHFIL - LYSAME; tALNRUB / RUBSPE / CAROBN - LYSAME; tPICSIT / CAROBN - LYSAME;

7 ELEPAL-AGRSTO(-CARAQU)(-SPARGANIUM)(-ALOGEN?)
Equivalents: CAROBN - CARAQUD; ELEPAL;
Ranks: G4S4; G5S5;
Ranks: G4G5S3; G5S4; G3S1;

8 SALHOO-MALFUS-LONINV-SPIDOU/PHAARU-CAROBN-ARGEGE
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU;SALHOO / (ARGEGE) - CAROBN; SPIDOU;
Ranks: G3S3; G4S4;

9 [ELEPAL-ALOGEN(-CAROBN)][CARAQU-ELEPAL-ARGEGE-ALOGEN]
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL;
Ranks: G4S4; G4S4; G5S5;

10' [ELEPAL(-CAROBN)][CARAQU-ELEPAL][PHAARU-ELEPAL(-CAROBN)][ELEPAL-ARGEGE][ELEPAL-AGRSTO]
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL;
Ranks: G4S4; G4S4; G5S5;

11 [LONINV-SPIDOU/[CAROBN-ELEPAL-CICDOU(-PHAARU)][ELEPAL-CICDOU(-PHAARU)][TYPLAT-CAROBN-ELEPAL-CICDOU(-PHAARU)]] [SCIMIC-CAROBN(-LYSAME)(-PHAARU)-ELEPAL-ARGEGE(-ALOGEN)][ELEPAL-CICDOU][CAROBN-ELEPAL-ARGEGE-CICDOU]]
THERE ARE AREAS OF WIDE GAPS BETWEEN SHRUBS: ELPA-CICDOU, SCMI-CAOB. THERE IS A LOT OF DWD AND A FEW STUMPS WITH SOME GASH, VAOV, VAPA.
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL; SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO / (ARGEGE) - CAROBN; SCHACU; SCIMIC; SPIDOU; TYPLAT;
Ranks: G4S4; G4S4; G5S5; G3S3; G4S4; G5S5; G4S4; G5S4; G5S5;

11' (SPIDOU-LONINV)/ELEPAL-CAROBN-ARGEGE-CICDOU(-PHAARU)
SOMETIMES CAOB>ELPA.
Equivalents: CAROBN - ARGEGE; ELEPAL;SPIDOU
Ranks: G4S4;G5S5;G5S4

12 (SPIDOU)/PHAARU-CARAQU-ARGEGE-CAROBN-CINLAT-ELEPAL(-PUCPAU)(-JUNEFF)
DITCH BANKS. SPDO SEMIABUNDANT AT N END NEAR ROAD.
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL; JUNEFF;
Ranks: G4S4; G4S4; G5S5; G5S5;

13 ALOGEN-ARGEGE-LOTCOR-ELEPAL(-CARAQU)(-PHAARU)(-JUNEFF)(-RANREP)(-LYSAME)(-CAROBN)
HIGHER AND DRIER ACCESS.
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL; JUNEFF;
Ranks: G4S4; G4S4; G5S5; G5S5;

13' POAPAL-PHAARU-JUNEFF-LOLPER-ARGEGE-PLAMAJ-LOTCOR-BELPER-LYSAME-MEDLUP-TRIDUB-CERVUL-TRIREP-MATRICARIA-ALOGEN
Equivalents: CAROBN - ARGEGE; JUNEFF;
Ranks: G4S4;G5S5;

13''' CAROBN-PHAARU-LYSAME-ARGEGE-RANREP-POA SPANN(-ELEPAL)
Equivalents: CAROBN; CAROBN - ARGEGE; ELEPAL;
Ranks: G4S4; G4S4; G5S5;

13'' PHAARU-JUNEFF-COMPAL-ALOGEN-LYSAME-ARGEGE(-LOTCOR)(-HOLLAN)(-RANREP)(-SCIMIC)
Equivalents: CAROBN - ARGEGE; JUNEFF; SCIMIC;
Ranks: G4S4; G5S5; G4S4;

14 ELEPAL-CARAQU-ALOGEN(-CAROBN)
Equivalents: CAROBN - CARAQUD; ELEPAL;
Ranks: G4S4; G5S5;

14' ELEPAL-ALOGEN-CAROBN-CARAQU-LYSAME-PHAARU-JUNEFF-ARGEGE
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL
Ranks: G4S4; G4S4; G5S5;

15 ALOGEN-JUNEFF-ARGEGE-LYSAME-POA SP SPP-PHAARU-LOTCOR-GALCYM-TRIREP-RANREP-HOLLAN-LOLPER-FESARU(-CAROBN)
Equivalents: CAROBN - ARGEGE; JUNEFF;
Ranks: G4S4;G5S5;

16 [CAROBN-CARAQU-LOTCOR-ARGEGE-LYSAME][ELEPAL-ARGEGE-ALOGEN-LYSAME-PHAARU][CAROBN-CARAQU-ELEPAL-LYSAME-ARGEGE][ELEPAL-ALOGEN(-PHAARU)(-CAROBN)(-CARAQU)(-SPARGANIUM)(-POLPER)(-LUDPAL)
Equivalents: CAROBN; CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL;
Ranks: G4S4; G4S4;G4S4; G5S5;

17 SALHOO-SALLAS(-MALFUS)(-ALNRUB)/CAROBN-PHAARU-LYSAME-OENSAR-LUDPAL
Equivalents: SALHOO - (MALFUS) / CAROBN - LYSAME;
Ranks: G3S2;

17' ALNRUB/SALHOO-SALLAS/CAROBN-PHAARU-LYSAME
Equivalents: ALNRUB/RUBSPE/CAROBN-LYSAME
Ranks: G4S4;

18 ARTIFICIAL DITCH AND SIDECAST SOILS. SIDECAST:HOLLAN-POA SP-LOTCOR-LOLPER-BELPER. DITCH: JUNEFF-PHAARU-(SCIMIC)(CAROBN)VERAME,LOTCOR,MIMMOS,CAREX SP, MYOSCI, RANREP, CALLITRICHE
ARTIFICIAL DITCH AND SIDECAST SOILS.
Equivalents: NONE
Ranks: NONE

19 POA SP-LOLPER-HOLLAN-HYPRAD-CERVUL-RUMACE-DACGLO-LOTCOR-FESTUCA(RUB)(-DIGPUR)(-RUBARM)
Equivalents: NONE
Ranks: NONE

20 [UPLAND: PICSIT-ALNRUB-SALHOO/RUBARM-RHAPUR-RUBSPE-GAUSHA/POLMUN-RUBURS-PTEAQU-RUDERAL WEEDS] [SWALE: PICSIT-ALNRUB-SALHOO/CAROBN-ATHFIL-LYSAME-OENSAR-PHAARU]
Equivalents: ALNRUB / ATHFIL - LYSAME;ALNRUB / RUBSPE / CAROBN -

LYSAME;PICSIT/RUBSPE
Ranks: G4G5S3; G5S4;G4S3

20' SALHOO-SPIDOU/CAROBN-PHAARU-LYSAME-OENSAR
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME;
Ranks: G3S3; G3S2;

21 SPIDOU(-SALHOO)(MALFUS)(-LONINV)/PHAARU-CAROBN-ELEPAL-ARGEGE-TYPLAT(-LYSAME)(-LOTCOR)(-OENSAR)(-CICDOU)(-LATHPALU)(-SCHACU)
Equivalents: CAROBN - ARGEGE; ELEPAL; OENSAR; SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME; SALHOO / (ARGEGE) - CAROBN; SCHACU; SPIDOU; TYPLAT;
Ranks: G4S4; G5S5; G4S4; G3S3; G3S2; G4S4; G5S5; G5S4; G5S5;

22 ALNRUB-SALHOO(-PICSIT)/SPIDOU/CAROBN-LYSAME-PHAARU
Equivalents: SALHOO - (MALFUS) / CAROBN - LYSAME; SALHOO / (ARGEGE) - CAROBN; SPIDOU
Ranks: G3S2;G5S4;

22B PHAARU
Equivalents:
Ranks:

23 SPIDOU-SALHOO/CAROBN-PHAARU-LYSAME
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME;
Ranks: G3S3; G3S2;

24 (SPIDOU)(SALHOO)(LONINV)/[CAROBN-ARGEGE(-ELEPAL)(-JUNEFF)][ELEPAL-ALOGEN(-ARGEGE)(-CALLITRICHE)][TYPLAT-ELEPAL(-CAROBN)(-JUNEFF)(-PHAARU)][CARAQU-CAROBN-ELEPAL-ARGEGE(-JUNEFF)(-CICDOU)((-PHAARU)][SCHACU-CAROBN][PHAARU-SCIMIC-CAROBN-ARGEGE]
Equivalents: CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL; JUNEFF; SCHACU; SCIMIC; TYPLAT;
Ranks: G4S4;G4S4; G5S5; G5S5; G5S5; G4S4; G5S5;

25 (SPIDOU)/FESARU-PHAARU-CHRLEU-RUBARM-HYPRAD-HOLLAN-LOTCOR-POAPAL-ANTODO
SPDO TRYING TO EMERGE ~1FT TALL
Equivalents:
Ranks:

25' RUBARM/PHAARU-DIGPUR
Equivalents:
Ranks:

26 ALNRUB/RUBARM-SPIDOU-LONINV/PHAARU-RUBURS-POLMUN-CAROBN-ATHFIL
Equivalents: tALNRUB / ATHFIL - LYSAME;
Ranks: G4G5S3;

26' ALNRUB/RUBARM-SPIDOU-LONINV/PHAARU-RUBURS-POLMUN
Equivalents: NONE
Ranks:

27 SALHOO-SPIDOU-LONINV(-MALFUS)/PHAARU-CAROBN
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME; SALHOO / (ARGEGE) - CAROBN; SPIDOU;
Ranks: G3S3; G3S2; G4S4; G5S4;

28 [SALHOO/RUBARM/PHAARU] [RUBSPE-RUBARM-RUBPAR(-LONINV)/PHAARU] [SALHOO-RUBPAR/PHAARU]
Equivalents: NONE
Ranks:

29 JUNEFF-LOTCOR-LYSAME-HOLLAN-RANREP-POAPAL-GALCYM(-CAROBN)(-PHAARU)
Equivalents: CAROBN; JUNEFF;
Ranks: G4S4; G5S5;

30 (RUBARM)/POA SP-HOLLAN-LOLPER-LOTCOR-TRIREP-RUMACE-FESARU-CHRLEU-TRIPRA-MEDLUP-FESTUCA SPP-BELPER-BROMOL-HYPRAD-DACGLO-RANREP
RUDI ABUNDANT AT END OF ARM/FINGER.
Equivalents:
Ranks:

31 [RHAPUR/RUBSPE-RUBARM/POLMUN-DICFOR(-DIGPUR)(-WEEDS)] [RHAPUR/PSEMEN/RUBSPE-RUBARM/RUBURS-POLMUN(-DICFOR)
LOTS OF RUDI AND SOME RULA. +/- IMPENETRABLE.
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

32 ALNRUB-PICSIT-TSUHET-RHAPUR-PSEMEN/RUBSPE-SAMRAC(-VACPAR)/[POLMUN-CLASIB-DICFOR(-MIMDEN)(-STAMEX)(-CARDEW)] [POLMUN(-OXAORE)(-CLASIB)(-MAIDIL)]
RUDI ON EDGES. SAW A RED LEGGED FROG HERE.
Equivalents: ALNRUB/RUBSPE/POLMUN; PICSIT/RUBSPE
Ranks: ~S5;G4S3

33 PICSIT-PSEMEN(-TSUHET)/RHAPUR/VACPAR(-RUBSPE)/MAIDIL-POLMUN-RUBURS-PROSMI(-PTEAQU)
Equivalents: PICSIT/RUBSPE

Ranks: G4S3

34 PICSIT-TSUHET-ALNRUB/RUBSPE-VACPAR(-GAUSHA)/[OXAORE-POLMUN-STAMEX-RUBURS-CLASIB-FESSUBULATA-VIOGLA-PROSMI] [MAIDIL-POLMUN]
THERE IS A ROAD GOING RIGHT THROUGH MIDDLE.
Equivalents: PICSIT/RUBSPE; PICSIT/OXAORE
Ranks: G4S3; G3S2

34' PICSIT-TSUHET-ALNRUB/RUBSPE-VACPAR(-GAUSHA)/ LYSAME-OXAORE-ATHFIL
THERE IS AN INTERMITTENT STREAM CHANNEL HERE.
Equivalents: ALNRUB / ATHFIL - LYSAME; tALNRUB / OXAORE
Ranks: G4G5S3; G4S4;

35 PICSIT-PSEMEN-TSUHET-ALNRUB/(MALFUS)(-HOLDIS)(-SAMRAC)/VACPAR-RUBSPE-RUBARM/RUBURS-PASTURE SPP-RANREP-STAMEX-CLASIB-PRUVUL-VIOSEM-VIOGLA-STEMED-LAPCOM
PISI D ~26. THERE IS A WOOD SHED IN THIS POLY AND A ROAD RUNS THROUGH THE MIDDLE. THERE IS HEHE IN THIS POLY.
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

36 ALNRUB/RUBARM/HOLLAN-POA SP-HYPRAD-LOTCOR
Equivalents:
Ranks:

37 ALNRUB-PICSIT(-PSEMEN)(-RHAPUR)/RUBARM(-LONINV)(-RUBSPE)(-VACPAR)(-MALFUS)(-HOLDIS)/POLMUN-RUBURS-PASTURE SPP
Equivalents: PICSIT/RUBSPE
Ranks: G4S3;

38 PICSIT-PSEMEN-ALNRUB(-TSUHET)(-RHAPUR)/PASTURE SPP-HOLLAN-VULBRO-POA SP-HYPRAD-LOTCOR-TRIREP-MEDLUP-RUMACE-VICSAT-RUBARM-LOLPER-RUMOCCOBT-BROMOL-AIRCAR-ACHMIL-DACGLO-CHRLEU-DIGPUR-ANTODO-TRIPRA
Equivalents:
Ranks:

39 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

39A POSS FESROE POCKET. FESTUCA-HOLLAN-POAPAL-TRIREP-HYPRAD-PRUVUL-RUMACE-RUBARM-RUBLAC(-STAMEX)
FESTUC HERE LOOKS LIKE IT COULD POSS BE F. ROEMERI. NEEDS INVESTIGATION.
Equivalents:

Ranks:

40 WET PASTURE. ALOGEN-POAPAL-JUNBUF-RORCUR-HYPRAD-LOTCOR-RANREP-TRIREP-JUNEFF
Equivalents:
Ranks:

41A ALNRUB(-PICSIT)/VACPAR-MENFER(-RUBSPE)/LYSAME-OENSAR-PUCPAU-POA SPCOM-EPIWAT-CALLITRICHE
THERE IS A CEMENT CYLINDER/WELL WITH A CEMENT COVER WITH A 6" HOLE IN THE MIDDLE.
Equivalents: tALNRUB / ATHFIL - LYSAME; ALNRUB / RUBSPE / CAROBN - LYSAME; tPICSIT / CAROBN - LYSAME; PICSIT / MENFER - VACPAR; PICSIT / RUBSPE;
Ranks: G4G5S3; G4S4; G3S1; G3S3; G3S3; G4S3;

41B ALNRUB/(RUBSPE)(RIBBRA)/RANREP-CLASIB-POAPAL(-LYSAME)(-ATHFIL)(-OENSAR)
Equivalents: ALNRUB / ATHFIL - LYSAME;
Ranks: G4G5S3

41C ALNRUB(-TSUHET)(-PICSIT)/RUBSPE-VACPAR/OXAORE-POLMUN-CLASIB-DICFOR-MIMDEN-BLESPI
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

42 [(ALNRUB-PICSIT)/RUBARM(-LONINV)(-RUBSPE)/COMPAL-HOLLAN-RANREP(-LYSAME)(-OENSAR)(-ATHFIL)] [RUBSPE(-RUBPAR)(-SAMRAC)/ATHFIL-LYSAME(-OXAORE)-CLASIB-TOLMEN-DICFOR-MIMDEN(-CHRGLE)]
THE STREAM FLOWS DOWN S SIDE OF POLY AGAINS A STEEPISH SLOPE. STREAM CHANNEL BECOMES +/- DEEPLY INCISED AND THE OPEN GROUND STARTS TO LOOK LIKE A ROAD (HEAVILY TRAMPLED BY ELK).
Equivalents: ALNRUB/ATHFIL-LYSAME
Ranks: G4G5S3

43 PICSIT-ALNRUB/RUBSPE-SAMRAC-RIBBRA/LYSAME-OENSAR[-OXAORE-CLASIB-POLMUN-BLESPI(-ATHFIL) [-TOLMEN-MIMDEN-OXAORE-CLASIB-ATHFIL-CHRGLE-POLMUN]
Equivalents: ALNRUB / RUBSPE / CAROBN - LYSAME; PICSIT / OXAORE; PICSIT / RUBSPE;PICSIT/CAROBN-LYSAME
Ranks: G4S4;G3S2;G4S3;G3S1

44 RUBARM/PASTURE SPP.
Equivalents:
Ranks:

45 POND: 1/3 OPEN WATER, 2/3 ALNRUB/LYSAME-OENSAR(-PUCPAU). Fringed by PICSIT/ALNRUB/RUBSPESAMRAC-LONINV/ATHFIL-POLMUN-MIMDEN-LYSAME
THERE IS SOME PHAR, BUT NOT MUCH. POND FORMED BY AN EARTHEN DAM AT JUNCTION OF 44 AND 45.
Equivalents: ALNRUB / ATHFIL - LYSAME; ALNRUB / POLMUN; ALNRUB / RUBSPE / CAROBN - LYSAME;
Ranks: G4G5S3; GUSU; G4S4;

45' POND: PHAARU-CALLITRICHE
ANOTHER POND FROM AN EARTHEN DAM. THERE IS A SMALL LYAM-OENSAR MARSH UPSTREAM.
Equivalents: CALHET
Ranks: G4S4

46 ALNRUB-PICSIT/RUBSPE-VACPAR/POLMUN-BLESPI-OXAORE(-MIMDEN)
POOR CONDITION AT EDGE WITH 39. CONTAINS THE ATTENUATED CREEK. THERE IS A SPRING AT THE TOP OF 46 BELOW WHERE ROAD CROSSES BETWEEN 46 AND 47.
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

47 ALNRUB-PSEMEN-PICSIT/RUBARM/PASTURE SPP
Equivalents:
Ranks:

48 ALNRUB-PICSIT-RHAPUR/VACPAR(-LONINV)/RUBARM(-RUBSPE)/DIGPUR-POLMUN-STAMEX-RUBURS-PASTURE SPP
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

49 TSUHET-RHAPUR(-PICSIT)(-PSEMEN)/RUBSPE(-VACPAR)/MAIDIL-POLMUN-RUBURS(-PROSMI)(-VIOSEM)(-DICFOR)
THERE ARE A COUPLE OF ROADS IN THIS POLY.
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

49' PICSIT-ALNRUB-TSUHET/SAMRAC-RUBSPE/[AT TOP NEAR PASTURE: RUBARM-STAMEX-TOLMEN-RANREP-POA SP-CLASIB] [OXAORE-CLASIB-POLMUN-ATHFIL-BLESPI-(MAIDIL)(-DICFOR)]
Equivalents: PICSIT/RUBSPE;ALNRUB/RUBSPE/POLMUN
Ranks: G4S3;~S5

49" PICSIT-ALNRUB-TSUHET/SAMRAC-RUBSPE/ LYSAME-OXAORE-ATHFIL
Equivalents: ALNRUB / ATHFIL - LYSAME; PICSIT / OXAORE; PICSIT / RUBSPE
Ranks: G4G5S3;G3S2;G4S3

50 ALNRUB/[PASTURE SPP][RUBARM(-SAMRAC)(-RUBSPE)]
THERE IS A LOT OF DIGPUR ON THE EDGE OF THE ROAD TO S.
Equivalents:
Ranks:

51 PICSIT-ALNRUB/RUBARM/HOLLAN-POA SP-HYPRAD-RUBURS-CERVUL-LOTCOR-TRIREP-DIGPUR (-FESTUCA CF RUBRA IN SHADY SPOTS)
Equivalents:
Ranks:

52 [LOLPER-FESARU-BROMOL-POAPAL-HYPRAD-AGROSTIS-DACGLO-TRIREP][HOLLAN-VULBRO-POA SP-HYPRAD-LOTCOR-TRIREP-MEDLUP-RUMACE-VICSAT-RUBARM-LOLPER-RUMOCC/OBT-BROMOL-AIRCAR-ACHMIL-DACGLO-CHRLEU-DIGPUR-ANTODO-TRIPRA-RANREP-AGROSTIS
Equivalents:
Ranks:

53 ALNRUB(-PICSIT)/(PICSIT)(TSUHET)/RUBSPE-SAMRAC(-RUBARM)(-VACPAR)/POLMUN-OXAORE-CLASIB-RUBURS(-STAMEX)(-DICFOR)(-MAIDIL)(-BLESPI)(-VIOGLA)
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

53' ALNRUB(-PICSIT)/(PICSIT)(TSUHET)/RUBSPE-SAMRAC(-RUBARM)(-VACPAR)/POLMUN-OXAORE-CLASIB-RUBURS(-STAMEX)(-DICFOR)(-MAIDIL)(-BLESPI)(-VIOGLA)
MORE SHRUBFIELD OPENNINGS THAN 53. HIGHER SARA.
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

54 (PICSIT-ALNRUB)/PASTURE SPP
THERE IS A VERY SICKLY SNC INFESTED 10 YO PLANTATION TO S AT BNDRY.
Equivalents:
Ranks:

55 (PICSIT-ALNRUB)sparse/PASTURE SPP.
Pasture spp list same as for poly 38.
Equivalents:
Ranks:

56 ALNRUB-PICSIT/RUBSPE-SAMRAC-RIBBRA/ATHFIL-POLMUN-TOLMEN-OXAORE-BLESPI-DICFOR-DRYEXP(-STAMEX)(-MIMDEN)(-PROSMI)(-LYSAME)(STRAMP)(-VIOGLA)
DRAW WITH PERENNIAL CREEK (AT LEAST AT BOTTOM).
Equivalents: ALNRUB / ATHFIL - LYSAME; PICSIT / OXAORE; PICSIT / RUBSPE;
Ranks: G4G5S3; G3S2; G4S3;

57 RUBARM-DIGPUR-PASTURE SPP
Equivalents:
Ranks:

58 PICSIT-ALNRUB/RUBARM-SAMRAC/DIGPUR-PASTURE SPP
Very weedy woodland.
Equivalents:
Ranks:

59 ALNRUB-PICSIT-PSEMEN/RUBSPE/POLMUN[-OXAORE-ATHFIL-BLESPI][-DICFOR-STAMEX-CLASIB]
MIX OF SHRUBLAND AND WOODLAND.
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

59' ALNRUB/[RUBSPE-SAMRAC/STAMEX-CLASIB-POLMUN-OXAORE(-TOLMEN)(-DICFOR)][LYSAME/OENSAR-CHRGLE(-TOLMEN)]
WETLAND DRAW THAT SHOULD POP ON LIDAR. THERE IS RUDI AND RANREP HERE.
Equivalents: ALNRUB/RUBSPE; ALNRUB/RUBSPE/CAROBN-LYSAME
Ranks: G5S4;G4S4

60 PICSIT-ALNRUB/RUBSPE-SAMRAC-MALFUS-RUBPAR-RHAPUR(-RUBARM)(-ACECIR)/OXAORE-CLASIB-RUBURS-STAMEX-DICFOR-BLESPI
Equivalents: PICSIT / OXAORE; PICSIT / RUBSPE
Ranks: G3S2; G4S3

60" PICSIT-ALNRUB/RUBSPE-SAMRAC(-RUBARM)
EMERGING PISI AND ALRU.
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

60A PICSIT-ALNRUB/RUBSPE-SAMRAC-MALFUS-RUBPAR-RHAPUR(-RUBARM)(-ACECIR)/OXAORE-CLASIB-RUBURS-STAMEX-DICFOR-BLESPI
Equivalents: PICSIT/RUBSPE; PICSIT/OXAORE;ALNRUB/OXAORE
Ranks: G4S3; G3S2;G4S4

61 ALNRUB(-PICSIT)(-TSUHET)/SAMRAC-RUBSPE(-RUBARM)/[PASTURE SPP][POLMUN-CLASIB-OXAORE-DICFOR-STAMEX-RUBURS]
Equivalents: PICSIT / RUBSPE; ALNRUB/RUBSPE/POLMUN
Ranks: G4S3;~S5

62 [PSEMEN-TSUHET-PICSIT/ALNRUB/VACPAR-RUBSPE(-RUBPAR)(-ACECIR)(-SAMRAC)/MAIDIL-RUBURS-POLMUN-OXAORE-FESSUB][PICSIT-TSUHET DOGHAIR/(RUBSPE)/POLMUN(-MAIDIL)(-OXAORE)(-CLASIB)
Equivalents: PICSIT / RUBSPE;PICSIT/POLMUN

Ranks: G4S3;G3S3

62" PICSIT-PSEMEN/ALNRUB/RUBSPE-VACPAR(-SAMRAC)/[MAIDIL-CLASIB-OXAORE][POLMUN]
D CONIF 20-24".
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

62"? PICSIT-PSEMEN/ALNRUB/RUBSPE-VACPAR(-SAMRAC)/[MAIDIL-CLASIB-OXAORE][POLMUN]
Equivalents: PICSIT/RUBSPE
Ranks: G4S3;

63 PASTURE. (PICSIT)(ALNRUB)/(RUBARM)/CERVUL-HYPRAD-BROMOL-SENSYL-DIGPUR-RUMACE-VULBRO
VERY WEEDY PASTURE WITH SCATTERED PISI, ALRU, RUDI
Equivalents:
Ranks:

64 (ALNRUB-PICSIT)/RUBSPE-RUBARM-SAMRAC
Equivalents: none
Ranks: none

65 PICSIT-PSEMEN-ALNRUB-RHAPUR/(RUBARM)/PASTURE SPP.
Equivalents:
Ranks:

66 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

67 PICSIT/RUBSPE
DOGHAIR. NO WEEDS.
Equivalents: PICSIT / RUBSPE;
Ranks: G4S3;

68 ALNRUB(-PSEMEN)/RUBSPE(-SAMRAC)/RUBURS(-MAIDIL)(-CLASIB)
ROADS THROUGH THE POLY.
Equivalents: ALNRUB / RUBSPE;
Ranks: G5S4;

69 ALNRUB(-PICSIT-PSEMEN-TSUHET)/RUBSPE-SAMRAC/[RUBARM-PASTURE SPP][POLMUN]
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

70 (ALNRUB-PICSIT)/RUBSPE-RUBARM-PASTURE SPP.
VERY YOUNG ALRU AND PISI < 15' TALL.
Equivalents: NONE
Ranks:

71 PICSIT-ALNRUB-TSUHET/RUBSPE-RUBARM-SAMRAC-RHAPUR/MAIDIL-OXAORE-DICFOR-CLASIB
Equivalents: PICSIT/RUBSPE; PICSIT/OXAORE
Ranks: G4S3;G3S2

72 ALNRUB(-PICSIT)/RUBSPE-SAMRAC/POLMUN-CLASIB
Equivalents: ALNRUB/RUBSPE/POLMUN; PICSIT/RUBSPE
Ranks: ~S5; G4S3

73 PSEMEN-PICSIT-ALNRUB/RUBSPE-RUBARM/POLMUN
Equivalents: PICSIT / RUBSPE;
Ranks: G4S3;

74 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

75 ALNRUB/PICSIT/RUBSPE/POLMUN
Equivalents: ALNRUB/RUBSPE/POLMUN;PICSIT/RUBSPE
Ranks: ~S5

76 ALNRUB/PICSIT/RUBSPE-SAMRAC/RUBARM-PASTURE SPP
Equivalents: ALNRUB/RUBSPE; PICSIT/RUBSPE
Ranks: G4S4; G4S3;

77 ALNRUB-PICSIT-PSEMEN/RUBSPE(-SAMRAC)/POLMUN
Equivalents: ALNRUB/RUBSPE/POLMUN; PICSIT/RUBSPE
Ranks: ~S5;G4S3

78 ALNRUB-RHAPUR-PICSIT/RUBSPE-SAMRAC(-RUBARM)/POLMUN
Equivalents: PICSIT / RUBSPE;
Ranks: G4S3;

79 ALNRUB/PICSIT/RUBSPE/POLMUN
Equivalents: PICSIT / RUBSPE;ALNRUB/RUBSPE/POLMUN
Ranks: G4S3;~S5

80 ALNRUB-PICSIT/RUBSPE/POLMUN
Equivalents: ALNRUB/RUBSPE/POLMUN; PICSIT/RUBSPE
Ranks: ~S5; G4S3

81 ALNRUB-PICSIT/RUBARM/PASTURE SPP
Equivalents:
Ranks:

81 ALNRUB-PICSIT/SALSCO-SALHOO/RUBSPE-MALFUS-SAMRAC-LONINV/PHAARU-LYSAME-OENSAR
Equivalents: tPICSIT / CAROBN - LYSAME
Ranks: G3S1;

81' ALNRUB(-SALHOO-PICSIT)/RUBSPE-MALFUS-LONINV/LYSAME(-ATHFIL)(-CAROBN)
NEAR ROAD CONDITION DECLINES TO M TO P BECAUSE OF RANREP, POA, ETC.
Equivalents: ALNRUB / ATHFIL - LYSAME; ALNRUB / RUBSPE / CAROBN - LYSAME
Ranks: G4G5S3; G4S4;

82' POAPAL-CIRVUL-PHAARU-RUMOCCOBT
TRANSITION TO UPLAND PASTURE
Equivalents:
Ranks:

83 ALNRUB-RHAPUR/RUBARM(-SAMRAC)(-RUBSPE)(-VACPAR)/(POLMUN)
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

84 ALNRUB-RHAPUR/PICSIT/[RUBARM(-MENFER)(-VACPAR)(-RUBSPE)/POLMUN] [ROADSIDE: VACPAR-GAUSHA(-VACOVA)(-MENFER)]
Equivalents: tPICSIT / MENFER - VACPAR; PICSIT/RUBSPE; ALNRUB/RUBSPE/POLMUN
Ranks: G3S3; G4S3;~S5

85 (RUBARM)/POA SP-HOLLAN-LOLPER-LOTCOR-TRIREP-RUMACE-FESARU-CHRLEU-TRIPRA-MEDLUP-FESTUCA SPP-BELPER-BROMOL-HYPRAD-DACGLO-RANREP
Equivalents:
Ranks:

85? (RUBARM)/POA SP-HOLLAN-LOLPER-LOTCOR-TRIREP-RUMACE-FESARU-CHRLEU-TRIPRA-MEDLUP-FESTUCA SPP-BELPER-BROMOL-HYPRAD-DACGLO-RANREP
Equivalents:
Ranks:

86 PICSIT-ALNRUB(-RHAPUR)(-TSUHET)/RUBARM(-VACPAR)(-RUBSPE)/PASTURE SPP
Equivalents:

Ranks:

87 PSEMEN-PICSIT-TSUHET/ALNRUB-RHAPUR/RUBSPE(-SAMRAC)/[POLMUN-OXAORE][POLMUN-MAIDIL][POLMUN-CLASIB]
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

88 ALNRUB-PICSIT-TSUHET/RUBSPE(-RHAPUR)(-SAMRAC)-VACPAR/POLMUN(-OXAORE)(-MAIDIL)(-CLASIB)
THERE ARE SOME CONIF OF D ~30. NOT MANY WEEDS EXCEPT ON EDGES.
Equivalents: PICSIT / RUBSPE;
Ranks: G4S3;

89 TSUHET-PICSIT-ALNRUB-RHAPUR/RUBSPE-VACPAR(-RUBARM)/POLMUN-PASTURE SPP
THERE IS AN OPENING AT TOP SURROUNDED IN CONIFS W/ RUDI HYPRAD PTAQ, VAPA, RHPU, RUSP
Equivalents: PICSIT/RUBSPE
Ranks: G4S3;

90 (RUBARM)/AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

91 RHAPUR(-ALNRUB)(-PICSIT)/[POLMUN-MAIDIL-(-DICFOR)(-RUBURS)][RUBSPE/POLMUN]
Equivalents: ALNRUB / POLMUN; ALNRUB/RUBSPE/POLMUN
Ranks: GUSU; ~S5

92 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

93 THUPLI-TSUHET-PICSIT-ALNRUB/RUBSPE
CONIF PLANTATION OVERGROWN WITH RUSP.
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

94 ALNRUB-PICSIT/RUBSPE-RUBARM/[POLMUN][PASTURE SPP ON ROAD]
ROAD AND VERY YOUNG FOREST.
Equivalents: PICSIT / RUBSPE;
Ranks: G4S3;

95 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU

Equivalents:
Ranks:

96 PASTURE TRANSITIONING TO RUBARM-RUBSPE-DIGPUR
Equivalents:
Ranks:

96' ALNRUB/RUBSPE-RUBARM
Equivalents: ALNRUB/RUBSPE
Ranks: G4S4;

97 ALNRUB/(PICSIT)/RUBARM-DIGPUR-PASTURE SPP
Equivalents:
Ranks:

98 ALNRUB-PICSIT/RUBSPE/POLMUN
Equivalents: PICSIT / RUBSPE; ALNRUB/RUBSPE/POLMUN
Ranks: G4S3; ~S5

99 (ALNRUB)/RUBSPE-SAMRAC/POLMUN-STAMEX-CLASIB
A FEW MID-SIZED ALRU PRESENT. THERE IS A ROAD RUNNING THROUGH POLY WITH PASTURE SPP ON IT.
Equivalents: NONE
Ranks:

101 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

102 PSEMEN-PICSIT-TSUHET(-ALNRUB)/(RHAPUR)/[RUBSPE/POLMUN-CLASIB-RUBURS-GALTRI][VACPAR(-RUBSPE)/RUBURS-CLASIB-GALTRI]
CONIF D ~18.
Equivalents: PICSIT/RUBSPE
Ranks: G4S3;

103 ALNRUB/(PICSIT)/RUBSPE/POLMUN(-RUBARM)-CLASIB(-PASTURE SPP)
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

104 ALNRUB-THUPLI-TSUHET-PICSIT/RUBSPE
CONIF PLANTATION OVERGROWN WITH RUSP
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

104? ALNRUB-THUPLI-TSUHET-PICSIT/RUBSPE
CONIF PLANTATION OVERGROWN WITH RUSP
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

105 ALNRUB/RUBSPE-SAMRAC/ATHFIL-POLMUN-TOLMEN-OXAORE-DICFOR-RUBARM
WL STREAM CHANNEL. PROB INTERMEITTENT BUT THERE IS H20 NOW (TRICKLE). DISSAPEARS INTO 106 AND ISN'T DISCERNIBLY HYDROPHYTIC THERE, BUT THERE IS A MINOR DRAINAGE PATTERN AND CHANNEL.
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

106 ROAD/PASTURE. HOLLAN-VULBRO-POA SP-HYPRAD-LOTCOR-TRIREP-MEDLUP-RUMACE-VICSAT-RUBARM-LOLPER-RUMOCCOBT-BROMOL-AIRCAR-ACHMIL-DACGLO-CHRLEU-DIGPUR-ANTODO-TRIPRA
Equivalents:
Ranks:

107 [RHAPUR(-PICSIT)/RUBARM][ALNRUB(-PICSIT)/RUBSPE-POLMUN]
Equivalents: PICSIT / RUBSPE;
Ranks: G4S3;

108 PICSIT(-ALNRUB)/RUBSPE(-VACPAR)(-SAMRAC)/POLMUN-CLASIB-STAMEX(-DICFOR)
THE 106 EDGE IS IN POOR CONDITION DUE TO RUDI.
Equivalents: PICSIT/ RUBSPE
Ranks: G4S3

109 ALNRUB(-PICSIT)/RUBSPE-RUBARM(-HOLDIS)(-RHAPUR)/POLMUN-CLASIB(-DIGPUR)
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

110 PICSIT-TSUHET-ALNRUB/RUBSPE-SAMRAC-VACPAR(-MENFER)(-GAUSHA)/POLMUN-BLESPI-MAIDIL(-OXAORE)(-CLASIB)(-VIOSEM)(-DRYEXP)
Equivalents: PICSIT/RUBSPE; PICSIT/MENFER-VACPAR
Ranks: G4S3; G3S3

111 ACECIR-RHAPUR-HOLDIS/RUBSPE/POLMUN-PASTURE SPP
Equivalents: NONE
Ranks:

112 LYSAME-PASTURE SPP-POAPAL-RANREP(-CIRVUL)(-DACGLO)
Equivalents:
Ranks:

113 ALNRUB-PICSIT/RUBSPE-SALHOO-MALFUS(-SAMRAC)(-LONINV)(-GAUSHA)/LYSAME-CAROBN-ATHFIL(-CHRGLE)(-OENSAR)
FROM MOSTLY LYAM-CAOB TO MOSTLY SHRUBS. THIS WILL BE A NICE SPRUCE SWAMP WHEN IT GROWS UP.
Equivalents: ALNRUB / ATHFIL - LYSAME; ALNRUB / RUBSPE / CAROBN - LYSAME; PICSIT / CAROBN - LYSAME

Ranks: G4G5S3; G4S4; G3S1

114 ALNRUB-SALHOO-RHAPUR(-PICSIT)/RUBSPE-RUBARM-LONINV-VACPAR/POLMUN
Equivalents:
Ranks:

115 ALNRUB(-PICSIT)(-TSUHET)/RUBSPE(-SAMRAC)(-VACPAR)(-MALFUS)/[POLMUN-PTEAQU-RUBURS][POLMUN-OXAORE][POLMUN-CLASIB]
Equivalents: ALNRUB/RUBSPE/POLMUN; PICSIT/RUBSPE
Ranks: ~S5

115/12 ALNRUB(-PICSIT)(-TSUHET)/RUBSPE(-SAMRAC)(-VACPAR)(-MALFUS)/[POLMUN-PTEAQU-RUBURS][POLMUN-OXAORE][POLMUN-CLASIB]
Equivalents: PICSIT/RUBSPE
Ranks: G4S3

116 ALNRUB/RUBSPE/LYSAME-CAROBN-OENSAR-RANREP(-CHRGLE)(-MENARV)
Equivalents: ALNRUB / RUBSPE / CAROBN - LYSAME;
Ranks: G4S4;

117 SPIDOU(-LONINV)(-SALHOO)(-MALFUS)/CAROBN-PHAARU(-CICDOU)(-LYSAME)(-SCIMIC)
Equivalents: CAROBN; SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME; SPIDOU;
Ranks: G4S4;G3S3; G3S2;G5S4;

118 ELEPAL-PHAARU-CAROBN(-ALOGEN)(-SPARGANIUM)(-CARAQU)(-OENSAR)(-CICDOU)(-LYSAME)(-ARGEGE)(-GALCYM)
Equivalents: CAROBN; CAROBN - ARGEGE; CAROBN - CARAQUD; ELEPAL; OENSAR;
Ranks: G4S4; G4S4; G4S4; G5S5; G4S4;

119 PICSIT-TSUHET/RUBSPE(SAMRAC)(-VACPAR)(-MENFER)/POLMUN-MAIDIL-OXAORE
Equivalents: PICSIT / MENFER - VACPAR;PICSIT / POLMUN; tPICSIT / RUBSPE
Ranks: G3S3;G3S3; G4S3

120 ALNRUB-PICSIT/SAMRAC-RUBSPE-RUBARM/PASTURE SPP
Equivalents:
Ranks:

121 SAMRAC-RUBSPE-RUBARM
Equivalents:
Ranks:

122 PICSIT-ALNRUB/SAMRAC-RUBSPE/PASTURE SPP-STAMEX
Equivalents:
Ranks:

123 ALNRUB-PICSIT-TSUHET//RUBSPE-SAMRAC(-RUBARM)/POLMUN-RUBURS-VIOGLA[OXAORE][-CLASIB]-[MAIDIL-OXAORE]
THERE ARE SOME DECENT SIZED PISI HERED - D~20". ALRU KINDOF SPINDLY ~8". RUDI PRETTY MUCH OBNLY AT BOTTOM.
Equivalents: PICSIT / RUBSPE; ALNRUB/RUBSPE/POLMUN
Ranks: G4S3;~S5

124 ALNRUB/RUBSPE/POLMUN-OXAORE-CLASIB-DICFOR
ALRU D ~4-8.
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

125 [PICSIT-TSUHET-PSEMEN/(VACPAR)(RUBSPE)(SAMRAC)/POLMUN-OXAORE][PSEMEN-TSUHET-PICSIT(-ALNRUB)/RUBSPE-VACPAR/POLMUN-OXAORE][TSUHET/(RUBSPE)/(POLMUN-RUBURS)]
Equivalents: PICSIT / POLMUN; tPICSIT / RUBSPE
Ranks: G3S3; G4S3;

126 PICSIT-TSUHET-ALNRUB/RUBSPE/POLMUN-RUBURS-MAIDIL
CONIF D ~8 AND 20. LOTS OF PISI AND TSHE REGEN MIXED INTO RUSP.
Equivalents: PICSIT / RUBSPE
Ranks: G4S3

127 AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

127? AGROSTIS-POAPAL-LOLPER-HOLLAN-BROMOL-DACGLO-HYPRAD-TRIREP-GERDIS-CHRLEU
Equivalents:
Ranks:

128 ALNRUB/RUBSPE(-SAMRAC)/POLMUN-CLASIB
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

129 ALNRUB/(PICSIT)/RUBSPE-SAMRAC/POLMUN-MAIDIL
RUDI ALONG ELK TRAIL THAT GOES THROUGH POLY.
Equivalents: ALNRUB/RUBSPE/POLMUN
Ranks: ~S5

129B ALNRUB/(PICSIT)/RUBSPE-RUBARM/STAMEX-PASTURE SPP
Equivalents: ALNRUB/RUBSPE

Ranks: G5S4;

130? [BANKS: ALNRUB/RUBSPE-SAMRAC/POLMUN-OXAORE-ATHFIL-LYSAME-BLESPI(-MAIDIL)(-CLASIB)(-VIOGLA)] [CHANNEL: ALNRUB/SAMRAC-RUBSPE/LYSAME-POLMUN-BLESPI-ATHFIL-TOLMEN-OXAORE]
CHANNEL HAS LOTS OF LYAM. FLOWING IN JUNE. 20' WIDE. CHANNEL WIDENS AT BOTTOM INTO SWAMP. CHRYSOSPLENIUM AND RUDI COME IN AT BOTTOM. BOTTOM OF POLY AT INTERFACE WITH MEADOW HAS SALLAS, GLYCERIA, OENSAR, RANREP, POAPAL, HOLLAN.
Equivalents: ALNRUB/ATHFIL-LYSAME; ALNRUB/RUBSPE/POLMUN
Ranks: G4G5S3;~S5;

131 PASTURE SPP WITH HIGH CHRLEU, HYPRAD - OTHERSISE LIKE 39.
ALNRUB PICSIT TSUHET INGROWTH.
ORIGINAL HOMESTEAD SITE
Equivalents:
Ranks:

132 PASTURE SPP/ROAD
Equivalents:
Ranks:

D DISTURBED
Equivalents:
Ranks:

K4 SALHOO(-SPIDOU)(-MALFUS)(-LONINV)/LYSAME-OENSAR-CAROBN-ATHFIL(-PHAARU)
shrub scrub wetland with significant SALHOO component. Fair condition- PHAR component.
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME;
Ranks: G3S3; G3S2;

K6 PICSIT-ALNRUB/RUBSPE-SPIDOU/CAROBN-LYSAME
forested wetland, older, PISI-ALRU/RUSP-SPDO/CAOB-LYAM. Good condition.
Equivalents: PICSIT / CAROBN - LYSAME;
Ranks: G3S1;

K6LM ALNRUB-PICSIT/LONINV-SPIDOU-SALHOO/ PHAARU-LYSAME
ALRU-PISI/LOIN-SPDO-SALHOO/ PHAR-LYAM. Fair condition- PHAR component.
Equivalents: PICSIT / CAROBN - LYSAME;SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME; SALHOO / (ARGEGE) - CAROBN; SPIDOU;
Ranks: G3S1;G3S2; G4S4; G5S4;

KA PICSIT-THUPLI/GAUSHA-POLMUN(-VACPAR)(-VACOVA)
PISI-THPL/GASH-POMU, also with VAPA, VAOV, good condition. Understory components vary as we make our way around the boundary.
Equivalents: PICSIT / GAUSHA; PICSIT / POLMUN

Ranks: G3S2; G3S3

KB PICSIT-THUPLI(-PSEMEN)/RUBARM-GAUSHA
PISI-THPL/RUDI-GASH, poor condition, also with a PSME component, but not sure if planted?
Equivalents: PICSIT / GAUSHA;
Ranks: G3S2;

N Not vegetated. Sand, water, cobble, etc.
Equivalents:
Ranks:

O1 (GAUSHA)/AMMARE(-LEYMOL)(-PTEAQU)(-LUPLIT)(-LATJAP)(-CERARV)(-MAIDIL)(TANCAM)(-ANAMMARE)(-FRACHI)(-ACHMIL)(-AIRPRA)(-HYPRAD)(-CARMACKOM)
DWARF GASH SMALL-PATCHY-DOMINANT.
Equivalents: LEYMOL - LATJAP; LUPLIT DUNES;AMMARE
Ranks: G1S1; G3S3;NONE

O2 GAUSHA-SPIDOU(-ROSNUT)(LONINV)/AMMARE-CALNUT-POLMUN
LEEWARD SIDE OF STEEP DUNE.
Equivalents: GAUSHA-SPIDOU/CALNUT
Ranks: ~S3

O3 LONINV-GAUSHA/POLMUN
LOWER LEEWARD
Equivalents: LONINV-GAUSHA/POLMUN
Ranks: ~S4

O4 PICSIT-PINCON/GAUSHA-SPIDOU-LONINV-RHAPUR-MALFUS
TREES KRUMHOLZ. D~9, H<=20'.
Equivalents: tPICSIT - tPINCONC / GAUSHA - VACOVA;
Ranks: G3S3

O5 PICSIT-PINCON/(ALNRUB)(RHAPUR)/LONINV-GAUSHA-SPIDOU(-MALFUS)(-VACOVA)/POLMUN-PTEAQU
TREES KRUMHOLZ. D~9, H<=20'.
Equivalents: GAUSHA - VACOVA / PTEAQU; PICSIT-PINCON/GAUSHA-VACOVA
Ranks: G3S3; G3S3;

O6 GAUSHA-LONINV-SPIDOU(-MYRCAL)/PTEAQU-POLMUN-AMMARE(-RUBURS)(-TANCAM)(-ANAMMARE)(-FRACHI)
THERE ARE SOME SMALL STUNTED PICO AND PISI.
Equivalents: GAUSHA - RUBSPE / (POLMUN); SPIDOU; GAUSHA-SPIDOU/POLMUN
Ranks: G4S3; ~S3

O7' (PINCON)(PICSIT)/RUBSPE-LONINV-SALHOO-ROSNUT-BERAQU/CALNUT-

CAROBN-HOLLAN-HYPRAD-TRIFOLIUM-ACHMIL-RUBURS-JUNLES-ANAMMARE-ANGLUC
Equivalents: NONE
Ranks:

O8 (SALHOO)(-SPIDOU)/CARAQU-CAROBN-COMPAL-NUPPOL-LYSAME
Equivalents: CARAQUD - COMPAL; CAROBN - CARAQUD;
Ranks: G2S2; G4S4;

O8' NUPPOL-LYSAME-AQUATICS
Equivalents: NUPLUTP;CALHET;NUPLUTP-LYSAME
Ranks: G5S5;G4S4;~S3

O9 PINCON-PICSIT/SALHOO-MALFUS-LONINV-GAUSHA(-RUBSPE)(-SPIDOU)/CAROBN-LYSAME(-EQUTEL)(-RUBURS)(-MAIDIL)(-OENSAR)(-ATHFIL)
Equivalents: tPICSIT / CAROBN - LYSAME;
Ranks: G3S1;

O10 SALHOO-MALFUS-LONINV/CAROBN-COMPAL(-LYSAME)(-NUPPOL)(-CARAQU)-GALIUM)(-CALLITRICHE STAG)
Equivalents: SALHOO - (MALFUS) / CAROBN - LYSAME;
Ranks: G3S2

O12 AMMARE-LATJAP-LEYMOL-LATLIT-AMMARE-ACHMIL-RUMACE-AIRA SPP-HYPRAD
LONINV, GASH, STUNTED PICO AND PISI A,LONG EDGE WITH 4. HONPEP ON DRY SAND BEACH BELOW. ANMA, ACHMIL, RUMACE, AIRA, HYPRAD BECOME MAJOR S OF PARKING AND BEACH ACCESS.
Equivalents: LEYMOL - LATJAP;AMMARE
Ranks: G1S1;NONE

O13 LONINV-SALHOO-PICSIT-PINCON-GAUSHA/CAROBN-POLMUN-AMMARE
DOESN'T LOOK WETLAND. PISI AND PICO ARE DWARF.
Equivalents: SALHOO / (ARGEGE) - CAROBN;AMMARE
Ranks: G4S4;NONE

O14 SALHOO-CYTSCO-PICSIT-PINCON-ALNRUB-GAUSHA/AMMARE(-CAROBN)-AIRA SPP-AMMARE-ACHMIL-LATJAP-POLMUN-POA SP CONFUNIL - WEEDS-ANGHEN
Equivalents: AMMARE
Ranks: NONE

O15 (SALHOO-ALNRUB)/AMMARE-DESCAE-TRIWOR-POA SPUNILAT-JUNFLATCAP-JUNLES-ARGEGE(-LOTCOR)(-CAROBN)(-HOLLAN)
ALRU AND SALHOO VERY SHORT AND EMERGING <2' TALL.
Equivalents: DESCAE - ARGEGE; JUNLES;AMMARE;JUNFAL - (JUNLES - JUNNEV)
Ranks: G3G4S2; G3S3;G3S3

O16 (SALHOO-ALNRUB)/SCIAME-JUNLES-CAROBN-TRIWOR-ARGEGE-AMMARE-DESCAE
SALHOO AND ALRU <6' TALL, EMERGING.
Equivalents: CAROBN - ARGEGE; DESCAE - ARGEGE; JUNLES; SCIAME ESTUARINE;
Ranks: G4S2; G3G4S2; G3S3; G3S2;

O17 (SALHOO)/SCIAME-ARGEGE-CAROBN-ELEPAL-DESCAE-CICDOU-JUNLES
THERE IS SOME SCATTERED LOTCOR AND IRPS HERE.
Equivalents: CAROBN - ARGEGE; DESCAE - ARGEGE; ELEPAL; JUNLES; SCIAME ESTUARINE;SALHOO / (ARGEGE) - CAROBN
Ranks: G4S2; G3G4S2; G5S5; G3S3; G3S2;G4S4

O18 PINCON-PICSIT/(GAUSHA)(-LONINV)/CALNUT-MAIDIL(-LOTCOR)(-FESARU)(-ANGLUC)(-CAROBN)
D~13. KINDOF TRAMPLED. THERE IS AN UNKNOWN SMALL CONIUM-LIGUSTICUM LIKE PLANT HERE (NOT FLOWERING).
Equivalents: NONE
Ranks:

O19 ALNRUB(PINCON-PICSIT)/LONINV-SAMRAC-SPIDOU-GAUSHA-RUBSPE/(POLMUN)(CALNUT)-RUBURS
LOOKS LIKE THIS GETS CUT DOWN. SHRUBS <5' TALL, AVE. 2.5'.
Equivalents: PICSIT/GAUSHA-RUBSPE
Ranks: G3S3

O20 ALNRUB-PINCON-PICSIT/GAUSHA-RUBSPE-LONINV/MAIDIL-CALNUT
Equivalents: PICSIT/GAUSHA-RUBSPE
Ranks: G3S3

O20B (LONINV-SALHOO)/AMMARE-LEYMOL-RUMACE-ARGEGE-JUNLES-LATJAP-LOTCOR
Equivalents: JUNFAL - (JUNLES - JUNNEV); JUNLES; LEYMOL - LATJAP;AMMARE
Ranks: G3S3; G3S3; G1S1;NONE

O21 PICSIT(PINCON)/(LONINV-RUBSPE-SALHOO-GAUSHA)/CAROBN(-MAIDIL)
LOTS OF DRIFTWOOD. EVIDENCE OF RECENT SALT KILL.
Equivalents: PICSIT/CAROBN;PINCON/CAROBN
Ranks: ~S3;G2S1

O21 PINCON-PICSIT/(ALNRUB)/LONINV-GAUSHA(-RUBSPE)/CALNUT-MAIDIL(-CAROBN)(-VICGIG)
THERE IS KINDOF A MOUNDED BERM ALONG INTERFACE WITH 17 AND 20 FOR EASTERN 50'. CONDITION DEGRADED BY BERM AND BRANCH PRUNING FOR VIEWS.
Equivalents: PICSIT - tPINCONC / GAUSHA - VACOVA; PICSIT/CALNUT-CAROBN

Ranks: G3S3; ~S3

O22 ALNRUB/RUBSPE/MAIDIL
D ALRU ~10.
Equivalents: ALNRUB / RUBSPE;
Ranks: G5S4;

O22B RUBSPE
Equivalents: NONE
Ranks:

O24 PICSIT-ALNRUB/LONINV-SALHOO-RUBSPE-GAUSHA/CAROBN
SALT KILL ZONE. A LOT OF DAMAGE TO EVEN CAOB AND ALRU. LOOKS LIKE THERE ARE SEVERAL PLACES WHERE THE SALT WATER FLOWED IN.
Equivalents: PICSIT/CAROBN
Ranks: ~S3

O24' ALNRUB-PINCON-PICSIT/GAUSHA-RUBSPE-LONINV/MAIDIL-CALNUT
UPLAND BERM. D~10.
Equivalents: PICSIT / GAUSHA - RUBSPE;
Ranks: G3S3;

O25 PICSIT-PINCON/ALNRUB/LONINV-GAUSHA-RUBSPE/CAROBN-CALNUT(-MAIDIL)(-DESCAE)
EDGE. SALT, WIND, DRIFTWOOD DAMAGE. GASH IS BROWNING BECAUSE OF SALT INJURY. ALRU IS SHORT/EMERGING.
Equivalents: PICSIT/CALNUT-CAROBN
Ranks: ~S3

O26 ARGEGE-ELEPAL-AGROSTIS
MOWED WETLAND WITH PICNIC TABLE.
Equivalents: NONE
Ranks:

O28 PICSIT/RUBSPE-LONINV(-GAUSHA)(-VACOVA)/[MAIDIL-CALNUT] [CAROBN]
D~20 IN {14-30}
Equivalents: PICSIT / RUBSPE;PICSIT / VACOVA
Ranks: G4S3; G3S3;

O29 PICSIT/GAUSHA(-LONINV)(-RUBSPE)(-MALFUS)(-VACOVA)/MAIDIL(-
Equivalents: PICSIT / GAUSHA
Ranks: G3S2;

O30 PICSIT/LONINV-RUBSPE-GAUSHA/[CAROBN-MAIDIL] [CALNUT-MAIDIL]
Equivalents: tPICSIT / GAUSHA - RUBSPE;PICSIT/CALNUT-CAROBN
Ranks: G3S3;~S3

O31 PICSIT/DEPAUP VACOVA-GAUSHA
D~9 IN {6-13}
Equivalents: PICSIT/VACOVA
Ranks: G3S3;

O32 PINCON-PICSIT/GAUSHA-LONINV-VACOVA(-MYRCAL)(-MALFUS)(-ALNRUB)/MAIDIL-RUBURS-AMMARE-ASTER-LAWN WEEDS AND GRASSES-POLMUN
TRAILSIDE LOW FOREST. KINDOF AN ARTIFICIAL ASSEMBLAGE. TREES <30' TALL.
Equivalents: PICSIT - PINCONC / GAUSHA - VACOVA;
Ranks: G3S3;

O33 ALNRUB-SALHOO(-SPIDOU)(-RUBSPE)(-LONINV)/(OENSAR)(DESCAE)(CAROBN)(RUMOCC)(PHAARU)(ANGLUC)
A LOT OF RECENTLY KILLED SHRUBS (MOSTLY ALRU). E PORTION DOMINATED BY MOSTLY KILLED ALRU/DECES. BAY SIDE TRANSITIONS TO 34.
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO / (ARGEGE) - CAROBN;
Ranks: G3S3; G4S4;

O34 [DESCAE-ARGEGE] [(ALNRUB)(SALHOO)(LONINV)(MYRCAL)DESCAE-ARGEGE-JUNLES-ASTER-LEYMOL(-LOTCOR)(-JUNFAL)] [CARLYN-DESCAE] [CAROBN-ELEPAL-ARGEGE] [SPARGANIUM] [LILOCC EDGE] [CALLITRICHE EDGE] [SCHACU-ELEPAL-CAROBN-JUNCUS SP.-SCIMIC-ARGEGE-CARLYN]
Equivalents: ARGEGE - JUNBAL; CARLYN - ARGEGE; CARLYN FRESHWATER; CAROBN; CAROBN - ARGEGE; CAROBN - ARGEGE; CAROBN - CARAQUD; DESCAE - ARGEGE; ELEPAL; JUNLES; SCHACU; SCIMIC;LILOCC;CALHET;SPAANG
Ranks: G3G4S2; G4S2; G4S2; G4S4; G4S4; G4S2; G4S4; G3G4S2; G5S5; G3S3; G5S5; G4S4;G3S3;G4S4;G4S3

O35 LONINV-MYRCAL/CAROBN-DESCAE-LATJAP
Equivalents: NONE: INTENSELY TRANSITIONAL
Ranks:

O37 PINCON-ALNRUB/(VACOVA)(-GAUSHA)/CAROBN(-OENSAR)(-ANGLUC)
PICO D~9. ALRU D~8.
Equivalents: PINCON/CAROBN
Ranks: G2S1

O38 PICSIT(-PINCON)/VACOVA-GAUSHA(-MYRCAL)(-MALFUS)
D~14.
Equivalents: tPICSIT - tPINCONC / GAUSHA - VACOVA;
Ranks: G3S3;

O38' PINCON-PICSIT/VACOVA-GAUSHA(-MYRCAL)(-MALFUS)

Equivalents: tPICSIT - tPINCONC / GAUSHA - VACOVA;
Ranks: G3S3;

O39 PICSIT/VACOVA(-GAUSHA)/MAIDIL
Equivalents: PICSIT / VACOVA;
Ranks: G3S3;

O40 PICSIT-BETULA-PINCON/(LONINV-MALFUS(GAUSHA)(RUBSPE)(SPIDOU)(RUBPAR)/MOWED TURF-JUNLES-CAROBN-MAIDIL-TRIWOR-ARGEGE-VICGIG-LOTCOR
SHRUB CLUMPS AROUND TREES, PICNIC TABLES AND MOWED WATER ACCESS BETWEEN CLUMPS. COULD ALMOST CALL IT DEVELOPED, BUT NOT QUITE. SOME PHAR, SPARGANIUM, DESCES, CICDOU, CAOB EMERGENT VEG ALONG SHORE.
Equivalents:
Ranks:

O41 RUBPAR/POA SPPRA-HOLLAN-RUBARM-CIRARV-GERDIS-ANTODO-RANREP-OENGLA(-RUBLAC)(-GERROB)
Equivalents:
Ranks:

O42 SALHOO-LONINV-ALNRUB-PICSIT-PINCON-MYRCAL-GAUSHA/LEYMOL-AMMARE-LATJAP-ANGLUC-DESCAE-JUNLES-CAROBN-ARGEGE
NOT WETLAN, BUT FLOOD PLAIN.
Equivalents: SALHOO - MYRCAL; CAROBN - ARGEGE; DESCAE - ARGEGE; JUNLES; LEYMOL - LATJAP; SALHOO / (ARGEGE) - CAROBN;
Ranks: G4S4; G4S2; G3G4S2; G3S3; G1S1; G4S4;

O43 PICSIT-PINCON-SALHOO-ALNRUB-LONINV-MYRCAL/GAUSHA-LONINV-RUBSPE-VACOVA/[MAIDIL] [CAROBN] [DEPAUP]
D `8. TREES LESS THAN 30' TALL. HUMMOCKY WETLAND MOSAIC. HONPEP ALONG EDGE WITH 42. CYSC ON EDGE.
Equivalents: SALHOO - MYRCAL;PICSIT-PINCON/GAUSHA-VACOVA
Ranks: G4S4;G3S3

O44 CYTSCO/AMMARE-CAKILE-CONVULVULUS
Equivalents:
Ranks:

O45 PINCON-PICSIT/GAUSHA-VACOVA-MYRCAL-MALFUS/[MAIDIL-POLMUN] [CAROBN-MAIDIL]
D ~12. WETLAND MOSAIC.
Equivalents: PICSIT - PINCONC / GAUSHA - VACOVA
Ranks: G3S3

O46 PICSIT(-ALNRUB)/[GAUSHA/CAROBN-MAIDIL-LYSAME] [CAROBN-LYSAME] [VACOVA-GAUSHA-RUBSPE-MALFUS-SALHOO-LONINV/CAROBN-MAIDIL] [VACOVA-GAUSHA/MAIDIL]

D~20 IN {9-36}. There is at least 1area of impenetrable MAFU-GASH/MADI2.
Equivalents: PICSIT / CAROBN - LYSAME; PICSIT / VACOVA
Ranks: G3S1;G3S3

O46B (PINCON)/ARCUVA-AMMARE-CARRAM-PTEAQU-HYPRAD-LEOTAR-AIRPRA-VULPIA-CYTSCO-ABRLAT
PICO/ARCUVA ELEMENTS ON EDGES. FIRE PIT AREA. THERE IS ABRLAT HERE.
Equivalents: PINCON/ARCUVA;AMMARE
Ranks: G1S1;NONE

O47 PICSIT(-ALNRUB)/[GAUSHA/MAIDIL] [GAUSHA-RUBSPE/CAROBN(-
MOSTLY WETLAND. D ~24 IN {12-48}.
Equivalents: PICSIT / CAROBN - LYSAME; tPICSIT / GAUSHA; tPICSIT / GAUSHA - RUBSPE;
Ranks: G3S1; G3S2; G3S3;

O48 PINCON-PICSIT-ALNRUB-RHAPUR/PICSIT/GAUSHA-MALFUS(-RHOMAC)
D PICO ~10. D PISI~18.
Equivalents: tPICSIT - tPINCONC / GAUSHA - VACOVA;
Ranks: G3S3;

O49 PICSIT/RUBSPE-GAUSHA-MALFUS/CAROBN-LYSAME-BLESPI(-OENSAR)(-MAIDIL)(-ATHFIL)
D ~ 20. THERE IS A STREAM RUNNING TOWARD BEAVER CREEK IN THIS POLY.
Equivalents: PICSIT / CAROBN - LYSAME
Ranks: G3S1

O50 PICSIT/RUBSPE-GAUSHA/POLMUN
STEEP ROAD BANK.
Equivalents: tPICSIT / GAUSHA - RUBSPE
Ranks: G3S3;

O51 ALNRUB/RUBSPE/[CAROBN-LYSAME][MAIDIL-BLESPI]
D ~8.
Equivalents: tALNRUB / RUBSPE; tALNRUB / RUBSPE / CAROBN - LYSAME;
Ranks: G5S4; G4S4;

O51' ALNRUB-SALHOO-LONINV-GAUSHA/CAROBN
Equivalents: tALNRUB / RUBSPE / CAROBN - LYSAME;
Ranks: G4S4;

O52 PICSIT/GAUSHA-LONINV-SALHOO-RUBSPE-ALNRUB(-MALFUS)/[CAROBN][CALNUT][CALNUT-MAIDIL][VICGIG]
Equivalents: PICSIT / CAROBN - LYSAME;PICSIT / GAUSHA - RUBSPE;PICSIT/CALNUT-CAROBN
Ranks: G3S1; G3S3;~S3

O53 (LONINV)(ALNRUB)/DESCAE-CAROBN-CICDOU-OENSAR-ARGEGE-PHAARU-ELEPAL-JUNBAL(-SOLDUL)(-IRIPSE)
CHANNELS COME OFF STREAM, POSS ANIMAL CHANNELS OR CONNECTION TO FEEDER STREAM. THERE IS LILAEOPSIS, NUPPOL, SPARGANIUM. SODU ON W END OF POLY. IRPS IN MIDDLE ON SHORE.
Equivalents: ARGEGE - JUNBAL; CAROBN; CAROBN - ARGEGE; CAROBN - ARGEGE; DESCAE - ARGEGE; DESCAE - JUNBAL TIDAL; ELEPAL; JUNBAL; JUNBAL - CAROBN; OENSAR;
Ranks: G3G4S2; G4S4; G4S4; G4S2; G3G4S2; G4S2; G5S5; G5S5; G4S4; G4S4;

O54 (PINCON)/(GAUSHA-LONINV-RUBSPE(-RUBARM))/AMMARE-LEYMOL-EQUTEL-JUNLES-TRIWOR-ASTER-FRACHI-MAIDIL-AMMARE-LOTCOR-POA SP-ANGHEN
CLIFY/SCALABLE VEGETATED BLUFF. SALT PRUNED VEGETATION < 2' TALL.
Equivalents: JUNLES;AMMARE; LEYMOL-LATJAP
Ranks: G3S3;NONE;G1S1

O55 PICSIT-PINCON/GAUSHA-LONINV-VACOVA/CALNUT-MAIDIL-PTEAQU-AMMARE-ARCUVA
DEAD AND DYING PISI D ~16. SMALL STUNTED PICO. STRANGE ORNAMENTAL OPP LEAVED HEBEOID W/ AXILLARY RACEMES.
Equivalents: tPICSIT - tPINCONC / GAUSHA - VACOVA;AMMARE;PICSIT/CALNUT
Ranks: G3S3;NONE;~S3

O60 PICSIT-ALNRUB/GAUSHA(-MALFUS)(-LONINV)(-VACOVA)/[PTEAQU-MAIDIL] [MAIDIL-CALNUT] [CAROBN-CALNUT]
INTERFACE WITH CREEK: PHAR-OENSAR-CICDOU-LILOCC
Equivalents: PICSIT / GAUSHA;PICSIT/CALNUT-CAROBN
Ranks: G3S2;~S3

O61 ALNRUB/LONINV-MALFUS-SALHOO-SPIDOU(-LONINV)/CAROBN
Equivalents: SALIX (SALHOO, SALSIT) - SPIDOU; SALHOO - (MALFUS) / CAROBN - LYSAME; ALNRUB/RUBSPE/CAROBN-LYSAME
Ranks: G3S3;G3S2;G4S4

O61' SPARGANIUM-CALLITRICHE
Equivalents:
Ranks: ~S3

O62 PICSIT/ALNRUB/RUBSPE-GAUSHA-LONINV-VACOVA(-MALFUS)(-RHAPUR)/[MAIDIL-POLMUN-CAROBN] [CAROBN-MAIDIL-POLMUN]
PISI D~30" IN {12-48}.
Equivalents: PICSIT / RUBSPE
Ranks: G4S3;

O63 PICSIT/LONINV-MALFUS/CAROBN-OENSAR

D ~18 IN {10-30"
Equivalents: tPICSIT / CAROBN - LYSAME;
Ranks: G3S1;

O64 (SALHOO-LONINV-SPIDOU)/ELEPAL-ARGEGE-SCIAME-CAROBN-DESCAE(-IRIPSE)(-COTULA)(-TYPLAT)(-SCHACU)
SALHOO, LONINV, SPDO ALONG FOREST EDGES. THERE ARE SMALL PATCHES OF A NON-FLOWERING GRASS THAT MAY BE ALOGEN. THERE IS QUITE A BIT OF IRPS. A LITTLE OF BRASS BUTTONS. THERE ARE A FEW CLUMPS OF CYSC ON HUMMOCKS.
Equivalents: CAROBN; CAROBN - ARGEGE; DESCAE - ARGEGE; ELEPAL; SCHACU; SCIAME FRESHWATER; TYPLAT;
Ranks: G4S4; G4S2; G3G4S2; G5S5; G5S5; G4S3; G5S5;

O65 SALHOO-MALFUS-LONINV/CAROBN-OENSAR-ARGEGE
Equivalents: SALHOO - (MALFUS) / CAROBN - LYSAME
Ranks: G3S2;

O67 (SALHOO-LONINV-SPIDOU)/ELEPAL-ARGEGE-SCIAME-CAROBN-DESCAE(-TYPLAT)
Equivalents: CAROBN - ARGEGE; DESCAE - ARGEGE; ELEPAL; SCIAME ESTUARINE; TYPLAT;
Ranks: G4S2; G3G4S2; G5S5; G3S2; G5S5;

O68 [DESCAE-ARGEGE] [(ALNRUB)(SALHOO)(LONINV)(MYRCAL)DESCAE-ARGEGE-JUNLES-ASTER-LEYMOL(-LOTCOR)(-JUNFAL)] [CARLYN-DESCAE] [CAROBN-ELEPAL-ARGEGE] [SPARGANIUM] [LILOCC EDGE] [CALLITRICHE EDGE] [SCHACU-ELEPAL-CAROBN-JUNCUS SP.-SCIMIC-ARGEGE-CARLYN][IRIPSE]
Equivalents: CARLYN - ARGEGE; CARLYN FRESHWATER; CAROBN - ARGEGE; CAROBN - CARAQUD; DESCAE - ARGEGE; DESCAE - JUNBAL TIDAL; ELEPAL;JUNBAL - CAROBN; JUNLES; SCHACU; SCIMIC;LILOCC;SPAANG;CALHET
Ranks: G4S2; G4S2; G4S2; G4S4; G3G4S2; G4S2; G5S5; G4S4; G3S3; G5S5; G4S4;G3S3;G4S3;G4S4

V Developed
Equivalents:
Ranks:

Appendix 4. Contents of GIS Data

The GIS data associated with this study is in the ESRI ArcGIS Personal Geodatabase format. The geodatabase contains the following feature classes:

hist_veg_ORBIC

Historic vegetation as reported in ORBIC's mapping.

hist_veg_model

Historic vegetation model based on reconnaissance plots for which data was collected in the current study.

rare_plants

ORBIC records of rare plants in the vicinity

InvasivePlants

Weed occurrence data

RarePlantHabitat

Modeled habitat for at-risk plant species based on site conditions and known habitat requirements

RestorationConcepts

Prioritization and general prescriptions for habitat restoration or maintenance for each polygon in the vegetation data.

Field mapped veg

Detailed plant community data mapped in the field. Not remote sensed.

Remote veg

Remotely sensed vegetation mapping.

reconplots

Field checked reconnassaince plots used to inform remote sensing model at the 2nd pass/plant community level.

Covertrainingplots

Landcover training plots for 1st-pass landcover classification.

"Field mapped veg" GIS Feature Class Fields:

Field Name	Description
POLY_ID	A polygon identifying code unique to each particular polygon in the data
OPRD_CODE	A code that captures habitat type, community number, age class, and condition in a single text string. Format: habitat abbrev.+seq. num.+ "-"+condition+ "("+age class+")"
FIELD_DATA	Acronym and text species composition data recorded in the field.
ACRONYM	Plant community name spelled out using abbreviations of scientific names.
SCI_NAME	Full plant community scientific name. "/" denotes a change in canopy layer. Parentheses indicate minor or localized species.
COM_NAME	Full plant community common name. "/" denotes a change in canopy layer. Parentheses indicate minor or localized species.
SCI_SHRT	Plant community composition for coarse-scale/aggregated plant community polygons, described in terms of plant scientific names. "/" denotes a change in canopy layer. Parentheses indicate minor or localized species.
EQUIV	Closest or equivalent plant association in the published literature.
ALLIANCE	NVCS land cover alliance.
RANK	Conservation/rarity ranking on a scale of 1 to 5 with 1 being critically imperiled, and 5 being stable.
HABITAT	Land cover type. F=forest, W=woodland, H=herbland/forbland, A=agriculture, DEV=developed, DIS=disturbed, N=nonvegetated
AGECLASS	Forest age class. A=old, B=mature, C=medium, D=young.
CONDITION	Condition of the plant community. E=excellent (no weeds or disturbance), G=good (minor weeds and/or disturbance, M=marginal (significant weeds and/or disturbance), P=poor (intense weed infestation and/or disturbance)
WETLAND	Wetland polygon indicator, representing wetland plant association types and other surface water features (yes/no/maybe/partially field)
SUITABLE	Botanical assessment of resource value of the habitat on a scale of 1 to 4 (1 being extremely valuable and in need of protection, and 4 being low-value)
PRIORITY	Priority of restoration or maintenance: Y or null.
FEASIBLE	Feasibility of restoration: High, Medium, or Low.
CRS_SEQ	Sequentially numbered community by habitat type for detailed level community naming.
PCOMS	Published and ranked component plant associations that appear to fit the vegetation mapped.
RANKS	The ranks of the potential equivalent plant associations above.
COMMENTS	Any additional comments related to the polygon or its data.

"Remote veg" GIS Feature Class Fields:

Field Name	Description
MAPCODE	A polygon identifying code unique to each particular polygon in the data
ACRONYM	Plant community name spelled out using abbreviations of scientific names.
EQUIV	Closest or equivalent plant association in the published literature.
RANK	Conservation/rarity ranking on a scale of 1 to 5 with 1 being critically imperiled, and 5 being stable.
HABITAT	Land cover type. F=forest, W=woodland, H=herbland/forbland, A=agriculture, DEV=developed, DIS=disturbed, N=nonvegetated
AGECLASS	Forest age class. A=old, B=mature, C=medium, D=young.
CONDITION	Condition of the plant community. E=excellent (no weeds or disturbance), G=good (minor weeds and/or disturbance, M=marginal (significant weeds and/or disturbance), P=poor (intense weed infestation and/or disturbance)
WETLAND	Wetland polygon indicator, representing wetland plant association types and other surface water features (yes/no/maybe/partially field)
SUITABLE	Botanical assessment of resource value of the habitat on a scale of 1 to 4 (1 being extremely valuable and in need of protection, and 4 being low-value)
PRIORITY	Priority of restoration or maintenance: Y or null.
FEASIBLE	Feasibility of restoration: High, Medium, or Low.
SNA	Whether or not the area is part of the registered State Natural Area Reserve.
PLANTATION	Whether or not the area is a clearcut or plantation.
COMMENTS	Any additional comments related to the polygon or its data.