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Pre-ABOVE: Land Cover and Vegetation Map Collection for Seward Peninsula, Alaska

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Documentation Revision Date: 2017-01-11

Data Set Version: V1

Summary

This data set provides two landcover and vegetation maps for the Seward Peninsula, Alaska. These maps were produced from existing maps, Landsat imagery, and color infrared aerial photography covering the period 1976-06-01 to 1999-09-01.

Map descriptions:

- Seward Peninsula Landsat MSS Classification: The map developed in 1999 covers the entire Seward Peninsula west of an arbitrary line drawn between the Elephant Point to the north, and the Koyukuk River Delta to the south at 50-m resolution. The legend includes six vegetation classes, water, barren, snow and ice, and shadows.
- Seward Peninsula Range Map: A vegetation map of the entire Seward Peninsula (includes the Baldwin Peninsula attached to the northeast corner) initiated with Landsat imagery in 1976 and enhanced using the color infrared aerial photography through 1983. The map includes 41 vegetation/land cover units.

There are three data files with this data set. The Landsat MSS Classification is in GeoTIFF (*.tif) format, with one layer file (.lyr) which corresponds to the .tif file. The Range Map is in one compressed shapefile (.shp) provided in a .zip file. One companion file, that contains the Range Map information in Google Earth (*.kmz) format, is also provided.

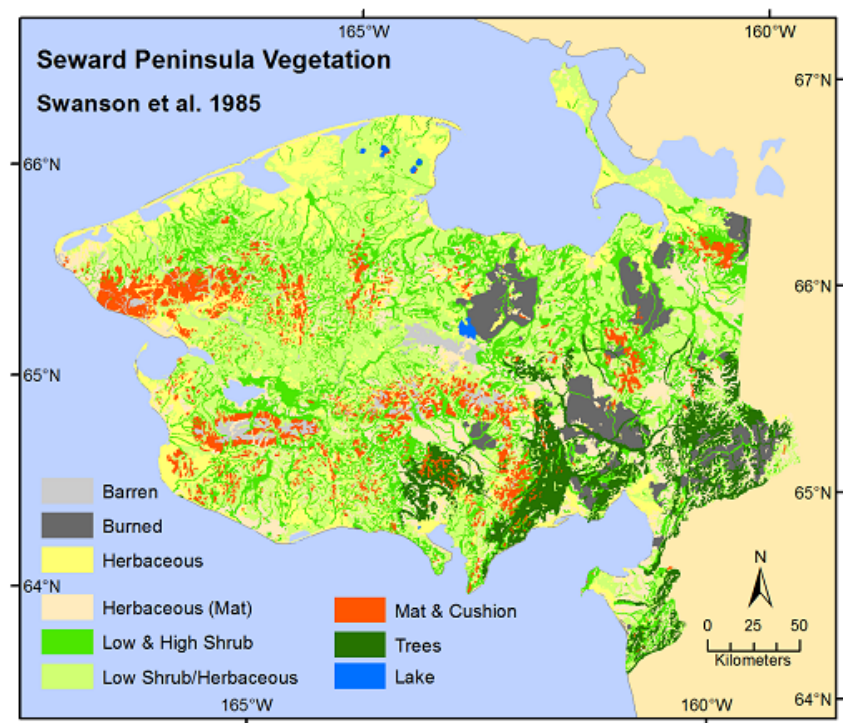


Figure 1. Vegetation map of the Seward Peninsula (Range Map, Swanson et al., 1985).

Citation

Raynolds, M.K., C. Thayer-Snyder, and J.D. Swanson. 2017. Pre-ABOVE: Land Cover and Vegetation Map Collection for Seward Peninsula, Alaska. ORNL DAAC, Oak Ridge, Tennessee, USA. <http://dx.doi.org/10.3334/ORNLDAAC/1363>

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1. Data Set Overview

This data set provides landcover and vegetation maps for the Seward Peninsula, Alaska. The Seward Peninsula is located in northwestern Alaska and comprises approximately 15 million acres. A wide diversity of land forms, climate zones, and vegetation are found on the Peninsula.

The maps were produced from several projects and data sources including existing maps, Landsat data, and color infrared aerial photography. The data cover the period 1976-06-01 to 1999-09-01.

Map descriptions:

- Seward Peninsula Landsat MSS Classification: The map developed in 1999 covers the entire Seward Peninsula west of an arbitrary line drawn between the Elephant Point to the north, and the Koyukuk River Delta to the south at 50-m resolution. The legend includes six vegetation classes, water, barren, snow and ice, and shadows.
- Seward Peninsula Range Map: A vegetation map of the entire Seward Peninsula (includes the Baldwin Peninsula attached to the northeast corner) initiated with Landsat imagery in 1976 and enhanced using the color infrared aerial photography through 1983. The map includes 41 vegetation/land cover units. The vegetation survey was designed to provide information for land resource management with special emphasis on reindeer range planning and management.

Project: Arctic-Boreal Vulnerability Experiment

The [Arctic-Boreal Vulnerability Experiment](#) (ABOVE) is a NASA Terrestrial Ecology Program field campaign that will take place in Alaska and western Canada between 2016 and 2021. Climate change in the Arctic and Boreal region is unfolding faster than anywhere else on Earth. ABOVE seeks a better

understanding of the vulnerability and resilience of ecosystems and society to this changing environment.

2. Data Characteristics

Spatial Coverage: Seward Peninsula, Alaska

ABOVE Site Designation:

Domain: Core ABOVE region

State/territory: Alaska (Seward Peninsula)

Grid cells: Ah0Av0

Spatial Resolution: 50 m

Temporal Coverage: 19760601 to 19990901

Temporal Resolution: One time

Study Area: (all latitudes and longitudes given in decimal degrees)

Site	Westernmost Longitude	Easternmost Longitude	Northernmost Latitude	Southernmost Latitude
Seward Peninsula, Alaska	-168.542	-159.189939	66.95186	63.96583

Data file information

There are three data files with this data set. The Landsat MSS Classification is in GeoTIFF (*.tif) format, with one layer file (.lyr) which corresponds to the .tif file. The Range Map is in one compressed shapefile (.shp) provided in a .zip file. One companion file, that contains the Range Map information in Google Earth (*.kmz) format, is also provided.

Table 1: Data file names and descriptions

Data File	Description
aga_seward_landcover_thayer-snyder_2000.tif	The landcover map Seward Peninsula Landsat MSS Classification in GeoTIFF (.tif) format. The legend includes six vegetation classes, water, barren, snow and ice, and shadows.
aga_seward_landcover_thayer-snyder_2000.lyr	A layer file for the .tif file above
aga_seward_vegetation_swanson_1985.zip	The vegetation map Seward Peninsula Range Map in shapefile (.shp) in compressed (*.zip) format. There are 41 mapping units.

Properties of the GeoTIFF file

Table 2: Attributes of the GeoTIFF file

File Name	Map units	Fill Value	Data Type	Number of Bands	Range of Values
aga_seward_landcover_thayer-snyder_2000.tif	meters	-2.1E+09	Int32	1	0 - 9

Table 3: Extent of the GeoTIFF

File Name	West	East	North	South
aga_seward_landcover_thayer-snyder_2000.tif	-168.542	-159.189939	66.77944	63.96583

Properties of the shapefile

Table 4: Attributes of the shapefile

File Name	Attributes
aga_seward_vegetation_swanson_1985.shp	MUID_NAME: Vegetation type. There are 41 mapped units. Refer to Section 5 for a listing of these units ACRES: Area of polygon

Table 5: Extent of the shapefile

File Name	West	East	North	South
aga_seward_vegetation_swanson_1985.shp	-168.124968	-159.189939	66.95186	64.029694

Companion files

Table 6. Companion file names and descriptions

Data File	Description
aga_seward_vegetation_swanson_1985.kmz	The vegetation map Seward Peninsula Range Map provided in .kmz format for viewing in GoogleEarth. Provides the same data as the shapefile aga_seward_vegetation_swanson_1985.shp
Swanson_et_al_1985.pdf	A document which describes the Seward Peninsula Range Map and vegetation-range surveys
Raynolds_et_al_2002.pdf	A document which describes the Seward Peninsula Landsat MSS Classification mapping efforts, a comparison to other landcover maps, and vegetation surveys
Seward_Peninsula_Veg_Maps.pdf	A pdf of this guide document

3. Application and Derivation

These data could be of value to climate change studies.

4. Quality Assessment

Seward Peninsula Landsat MSS Classification map

The Seward Peninsula Landsat MSS Classification map was compared to two other maps in Reynolds et al 2002: the Soil Conservation Service Range Mapping (Swanson et al 1985) (SCS) and the Major Ecosystems of Alaska (Joint Federal-State Land Use Planning Commission 1973) (MEA). Results indicated that the precise distribution of the land-cover categories was highly variable.

Total agreement between the three maps was not impressive (38.7% between the MSS and MEA maps, and 41.8% between the MSS and SCS maps). The main cause of the relatively large margin of disagreement was most likely due to the comparison between vector based data (MEA and SCS) and raster based data (MSS). An additional factor affecting the low agreement of the maps could be caused by the independently derived land-cover classification systems employed by the creators of each data set (Reynolds et al., 2002). refer to the companion file **Raynolds_et_al_2002.pdf** for additional information.

Seward Peninsula Range Map

Please refer to the **Swanson_et_al_1985.pdf** companion file document.

5. Data Acquisition, Materials, and Methods

Study Site

The Seward Peninsula is located in northwestern Alaska and comprises approximately 15 million acres (including the Baldwin Peninsula attached to the northeast corner). A diversity of land forms, climate zones, and vegetation are found on the Peninsula. Bordered by the Chukchi Sea to the north, the Bering Strait to the west, and Norton Sound to the south, the Peninsula is surrounded by relatively cold water to the north and west but relatively warm water to the south. The temperature of surrounding water bodies serves as a large determinant to the distribution of land-cover present on the Peninsula (Reynolds et al., 2002). Vegetation types vary from high-elevation alpine meadows to tidal-influenced marshlands.

Map descriptions

Map: Seward Peninsula Landsat MSS Classification

This is a landcover map of the Seward Peninsula derived from the Landsat Multi-Spectral Scanner (MSS). The map is a preliminary, unsupervised Isoclass classification of a mosaic created by the US Geological Survey EROS Data Center in 1999. The legend includes six vegetation classes, water, barren, snow and ice, and shadows. The map extent is the entire Seward Peninsula west of an arbitrary line drawn between the Elephant Point to the north, and the Koyukuk River Delta to the south. The study area is approximately 50,000 square kilometers. The map was created to supply a detailed land-cover map for two National Science Foundation funded projects: the Arctic Transitions in the Land-Atmosphere System (ATLAS) project, and the Circumpolar Arctic Vegetation Map (CAVM) project (Raynolds et al., 2002).

For additional details on the vegetation, landcover, and mapping procedures, refer to the companion file document **Raynolds_et_al_2002.pdf**. This MSS map was compared to other Seward Peninsula vegetation maps. The **Raynolds et al 2002** document also provides very good information from a vegetation survey conducted towards the development of the other maps and the map comparisons: the Soil Conservation Service Range Mapping (Swanson et al 1985) (SCS) and the Major Ecosystems of Alaska (Joint Federal-State Land Use Planning Commission 1973) (MEA). Refer also to Section 4 of this guide document for a brief description of those results.

Map: Seward Peninsula Range Map

This is a vegetation map of the entire Seward Peninsula (including the Baldwin Peninsula attached to the northeast corner) derived from Landsat data and infrared color photography. The vegetation survey was designed to provide information for land resource management with special emphasis on reindeer range planning and management. The map includes 41 vegetation/land cover units (refer to the table below).

Table 7: Vegetation/Landcover Mapping Units

Physiognomy	Code number	Mapping unit name
Water	4	Lagoon
Water	5	Ocean
Trees	10	Mixed Forest (Floodplain)
Trees	11	Black Spruce
Trees	12	White Spruce (Upland)
Trees	13	Spruce-Lichen (Upland)
Trees	14	Paper Birch (Upland)
Trees	15	Spruce-Lichen (Palsa)
Tall Shrub	20	Tall Shrub (Floodplain)
Tall Shrub	21	Tall Shrub (Drainageway)
Tall Shrub	22	Tall Shrub (Hillside)
Low Shrub	32	Mixed Shrub (Tundra)
Low Shrub	34	Low Shrub Low Shrub
Low Shrub	35	Low Shrub (Hillside) (Undifferentiated) (35 A and/or 35 B)
Low Shrub/Herbaceous	41	Shrub Meadow (Mountain)
Low Shrub/Herbaceous	42	Tussock Tundra (Undifferentiated) (42 A and/or 42 B)
Low Shrub/Herbaceous	43	Alpine Mountain Meadow (complex)
Low Shrub/Herbaceous	44	Shrub-Lichen (Upland)
Low Shrub/Herbaceous	45	Water Sedge-Muskeg (Bog-Fen)
Herbaceous	50	Dunes (Beach)
Herbaceous	51	March (Tidal)
Herbaceous	52	Sedge (Wet Meadow)
Herbaceous	54	Sedge (Drainageway)
Herbaceous	55	Cottongrass-Water Sedge
Herbaceous	56	Breached Lake Bed (Undifferentiated) (56 A and/or 56 B)
Herbaceous	57	Sedge (Wet lake Bed)

Herbaceous (Mat)	60	Lichen (Tussock Tundra)
Herbaceous (Mat)	61	Lichen Meadow (Mountain)
Herbaceous (Mat)	63	Lichen-Sedge (Coastal Tundra)
Herbaceous (Mat)	64	Lichen-Sedge Meadow (Upland)
Herbaceous (Mat)	65	Lichen Slope (Upland)
Herbaceous (Mat)	66	Lichen Mat (Lowland Tundra)
Mat and Cushion	70	Lichen granitic Slope (Alpine)
Mat and Cushion	71	Dryas Limestone Slope
Mat and Cushion	72	Bald Limestone Slope
Mat and Cushion	74	Dryas-Lichen (Ridges)
Miscellaneous	80	Lava Bed
Miscellaneous	81	Barren
Miscellaneous	82	Riverwash
Miscellaneous	90	Burned Forest
Miscellaneous	91	Burned Tundra

In 1976, Landsat data were used to classify and map ecological sites in the northeastern areas of the Seward and Baldwin Peninsulas. Photo-interpretation of high altitude infrared color photography was used starting in 1979 and continuing through 1981, 1982 and 1983. The 1976 area was remapped using the color infrared aerial photography in 1983 (Swanson et al., 1985).

Refer to the companion file [Swanson_et_al_1985.pdf](#) for additional details.

6. Data Access

These data are available through the Oak Ridge National Laboratory (ORNL) Distributed Active Archive Center (DAAC).

[Pre-ABOVE: Land Cover and Vegetation Map Collection for Seward Peninsula, Alaska](#)

Contact for Data Center Access Information:

- E-mail: uso@daac.ornl.gov
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7. References

Raynolds, M. K., C. R. Martin, D. A. Walker, A. Moody, D. Wirth, and C. Thayer-Snyder. 2002. ATLAS Vegetation Studies: Seward Peninsula, Alaska, 2000: Vegetation, Soil, and Site Information, with Seward Vegetation Map. AGC Data Report.

Swanson, J. D., M. Schuman, and P. C. Scorup. 1985. Range survey of the Seward Peninsula reindeer ranges, Alaska. US Department of Agriculture Soil Conservation Service, Anchorage, Alaska.



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