LANDFIRE Biophysical Setting Model

Biophysical Setting 6817110 **Alaska Arctic Tidal Marsh**

☑ *This BPS is lumped with: BpS 1710, Alaska Arctic Tidal Flat*

☐ *This BPS is split into multiple models: Tidal flats are lumped with the Tidal Marsh because they are often barren or sparsely vegetated and therefore may not be mappable as a distinct BpS.*

General Information

Contributors (also see the Comments field **Date** 4/1/2008

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Vegetation Type

Wetlands/Riparian

Map Zone

68

Model Zone

☑ Alaska
☐ California
☐ Great Basin
☐ Great Lakes
☐ Northeast
☐ Northern Plains
☐ N-Cent.Rockies
☐ Pacific Northwest
☐ South Central
☐ Southeast
☐ S. Appalachians
☐ Southwest

Dominant Species*

CARA4
CASU8
CALY3
DUFI
PUCCI
AREG

General Model Sources

☑ Literature
☐ Local Data
☑ Expert Estimate

Geographic Range

This BpS is found along the coastline of arctic AK including along the Beaufort Sea, Chuckchi Sea and the Bearing Sea.

Biophysical Site Description

The following is based on information from the draft Ecological Systems Descriptions (Boggs et al. 2008) Talbot et al. (1985) and Jorgenson et al. (1997):
Tidal marshes often have sediment inputs from a freshwater source. The surface gradients are flat. Progradation of the tidal marsh front will occur if sedimentation exceeds erosion. Tidal marshes represent the area of transition from maritime to freshwater terrestrial systems and encompass a complex range of plant communities and ecotones including marshes and herbaceous or barren mudflats. They also feature a range of salinity conditions from saline to nearly fresh. (Tidal marshes in large bays with a high volume of freshwater input, such as Nushagak Bay, may be entirely fresh.) Soils are silts and clays and are periodically inundated by tidal fluctuation. The frequency of flooding may vary from twice daily (lower salt marsh) to once per growing season (upper coastal marsh).

Tidal flats form a narrow band along oceanic inlets, and are more extensive at the mouths of larger rivers. The dominant processes are tectonic uplift or subsidence, isostatic rebound and sediment deposition.

Vegetation Description

Tidal flats have <10% vascular species cover and are dominated by bare ground. Tidal marshes have >10% vascular species. Two existing vegetation types dominate the system: tidal sedge and tidal herbaceous. Carex ramenskii or Carex subspathacea dominate the tidal sedge existing vegetation type.

*Dominant Species are from the NRCS PLANTS database. To check a species code, please visit http://plants.usda.gov.
**Fire Regime Groups are: I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement seve

Carex subspathacea is more common along the Beaufort Sea. Carex lyngbyei may dominate on portions of the Yukon-Kuskokwim Delta and is often more inland or adjacent to tidal creeks. Dupontia fisheri and Puccinellia spp. dominate the tidal herbaceous existing vegetation type. Argentina egedii may dominate on Alaska's West coast but not on the Beaufort Coastal Plain.

The tidal zone, including zones subjected to storm surges, often show a consistent vegetation pattern moving inland, especially on the Yukon-Kuskokwim Delta. Tidal flats occur first, followed by the tidal herbaceous type (Puccinellia spp.), then tidal sedge (Carex ramenskii or Carex subspathacea), then the coastal brackish meadow ecological system (Carex rariflora, Calamagrostis deschampsoides, and Dendranthema arcticum), and finally the coastal sedge dwarf-shrub ecological system (Empetrum nigrum, Salix fuscescens, Salix ovalifolia, Carex rariflora, Calamagrostis deschampsoides, Deschampsia caespitosa). The next systems moving inland are non-tidal and include the dwarf-shrub-Sphagnum or permafrost plateau-dwarf-shrub-lichen systems.

Disturbance Description

Common disturbances in the marsh and mudflat system can include freshwater and tidal flooding, sediment deposition, storm surge and ice shove.

The Tidal Marsh may have a successional relationship with the Coastal Brackish Meadow but because each system can persist for long time periods they are treated as separate BpS.

Adjacency or Identification Concerns

Native Uncharacteristic Conditions

Scale Description

Small patch

Issues/Problems

Comments

This model was developed by Kori Blankenship and Keith Boggs based on the draft Arctic Ecological Systems description (Boggs et al. 2008).

Vegetation Classes

Class A **100 %**

Mid Development 1 All Structures

Upper Layer Lifeform

- [x] Herbaceous
- [ ] Shrub
- [ ] Tree

Indicator Species* and Canopy Position

CARA4	Upper
CASU8	Upper
CALY3	Upper
DUFI	Upper

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	Herbaceous	Herbaceous
Height	Herbaceous	Herbaceous
Tree Size Class	None	

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

Zero plus years

This class represents the Tidal Marsh and Tidal Flat systems.

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No disturbances modeled.

Class B 0 %

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Indicator Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover		
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class C 0 %

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Indicator Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover		
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class D 0 %

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Indicator Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover		
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class E 0 %

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Indicator Species* and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover		
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Disturbances

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Fire Regime Group:** NA

Historical Fire Size (acres)

Avg 0
Min 0
Max 0

Sources of Fire Regime Data

- [ ] Literature
- [ ] Local Data
- [x] Expert Estimate

Fire Intervals	*Avg FI*	*Min FI*	*Max FI*	*Probability*	*Percent of All Fires*
Replacement					
Mixed					
Surface					
All Fires					

Fire Intervals (FI):
Fire interval is expressed in years for each fire severity class and for all types of fir combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inver of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

Additional Disturbances Modeled

- [ ] Insects/Disease
- [ ] Wind/Weather/Stress
- [ ] Native Grazing
- [ ] Competition
- [ ] Other (optional 1)
- [ ] Other (optional 2)

References

Batten, A.R., S Murphy and D.F. Murray. 1978. Definition of coastal wetlands by floristic criteria. USEPA no. 804965-01. US Environmental Protection Agency, Corvalis Environmental Research Laboratory, Corvalis, OR. 490 p.

Boggs et al. 2008. International Ecological Classification Standard: Terrestrial Ecological Classifications. Draft Ecological Systems Description for the Alaska Arctic Region.

Jorgenson, M. T., J. E. Roth, E.R. Pullman, R.M. Burgess, M.K. Raynolds, A.A. Stickney, M.D. Smith and T.M. Zimmer. 1997. An ecological land survey for the Colville River Delta, Alaska. ABR, Inc. Fairbanks, AK. 141 p.

National Wetlands Working Group. 1997. Wetlands of Canada. C. D. A Rubec, editor. Ecological Land Classification Series No. 24. Environment Canada, Ottawa, and Polyscience Publications, Inc., Montreal. 452 pp.

Talbot, S.S., M.D. Fleming and C.J. Markon. 1985. U.S. Fish and Wildlife Service LANDSAT-Facilitated vegetation map and vegetation reconnaissance of Yukon Delta National Wildlife Refuge, Alaska. Resource Support, U.S. Fish and Wildlife Service, Anchorage, Alaska.

Viereck, L.A., C.T. Dyrness, A.R. Batten and K.J. Wenzlick. 1992. The Alaska vegetation classification. Pacific Northwest Research Station, USDA Forest Service, Portland, OR. Gen. Tech. Rep. PNW-GTR286. 278 p.

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