

# **EPA's benthic habitat data for Yaquina estuary**

**Presented by Ted DeWitt**

## **Data Set Contributors:**

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**Technical Assistance: Pat Clinton (CSC/Indus), Dynamac Corp.**

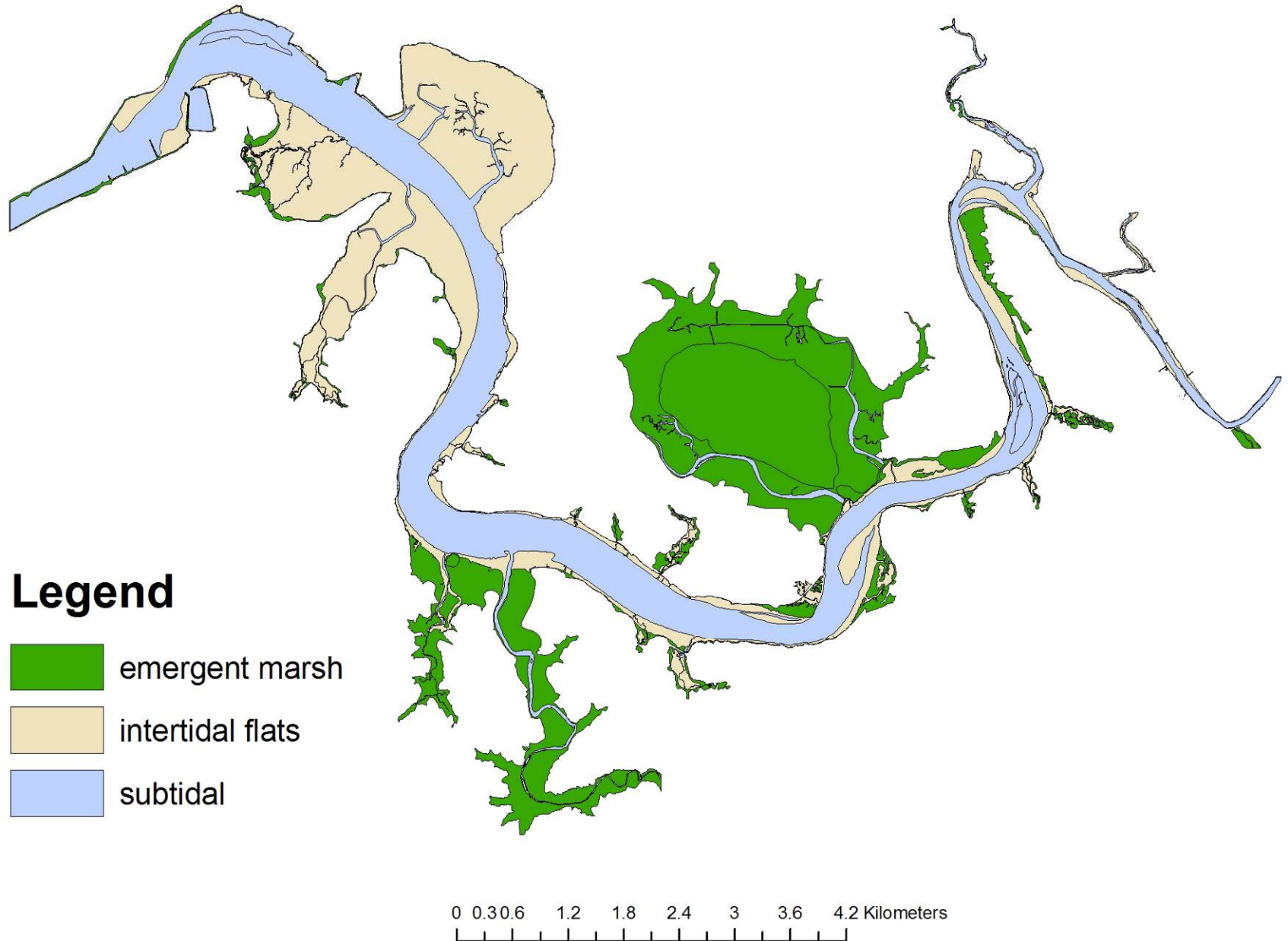




Examples of Yaquina estuary benthic habitat data sets at EPA/Western Ecology Division

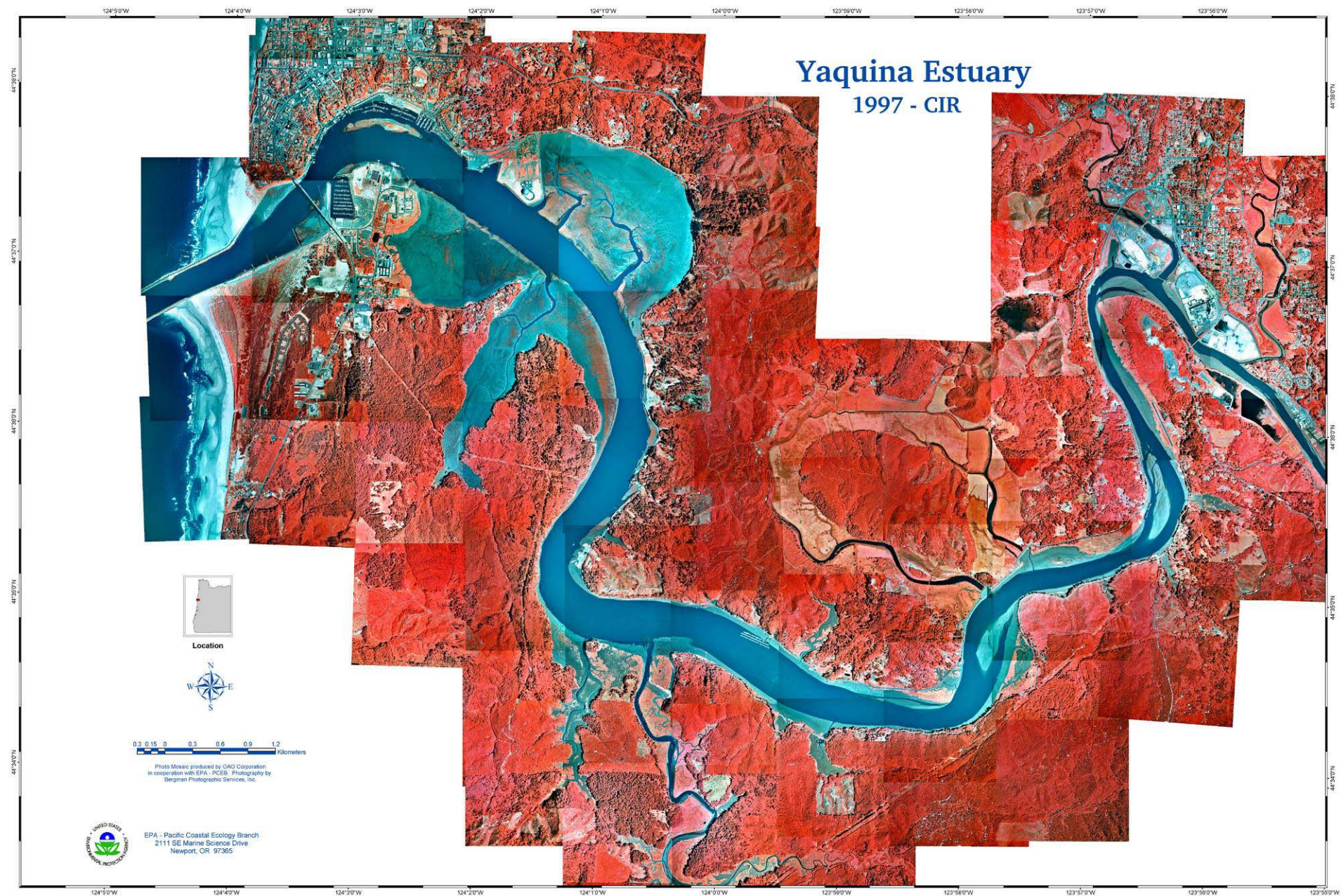
Map Description	Year	Month	Habitat	Extent of coverage
1. Maps				
Aerial photomosaic, color infrared photographs	1997-2004	various; April-Sept	Intertidal & channel	whole estuary or lower & mid estuary
Bathymetry + topography	1998, 1999, 2000, 2002	various	intertidal & subtidal	whole estuary
Wind-wave exposure (modelled)	2000?	?	Intertidal	whole estuary
Intertidal UVB Exposure	1996	seasonal	Intertidal	whole estuary
Intertidal and subtidal habitats	1998-2002	N/A	All	lower & mid estuary
Intertidal submerged aquatic vegetation (seagrass & macroalgae)	1997, 1998, 2004	various	Intertidal	lower & mid estuary
Subtidal seagrass	2005	May-Sept	Subtidal	lower & upper estuary; limited areas
Burrowing shrimp species, abundance	2002	May-July	Intertidal	whole estuary
Amphipod Distribution (6 spp.)	1994, 1996, 1999	June-Aug	Intertidal	whole estuary

# GIS polygons for major habitat-types in Yaquina estuary





# Map of Yaquina estuary composed of mosaicked aerial color-infrared photographs







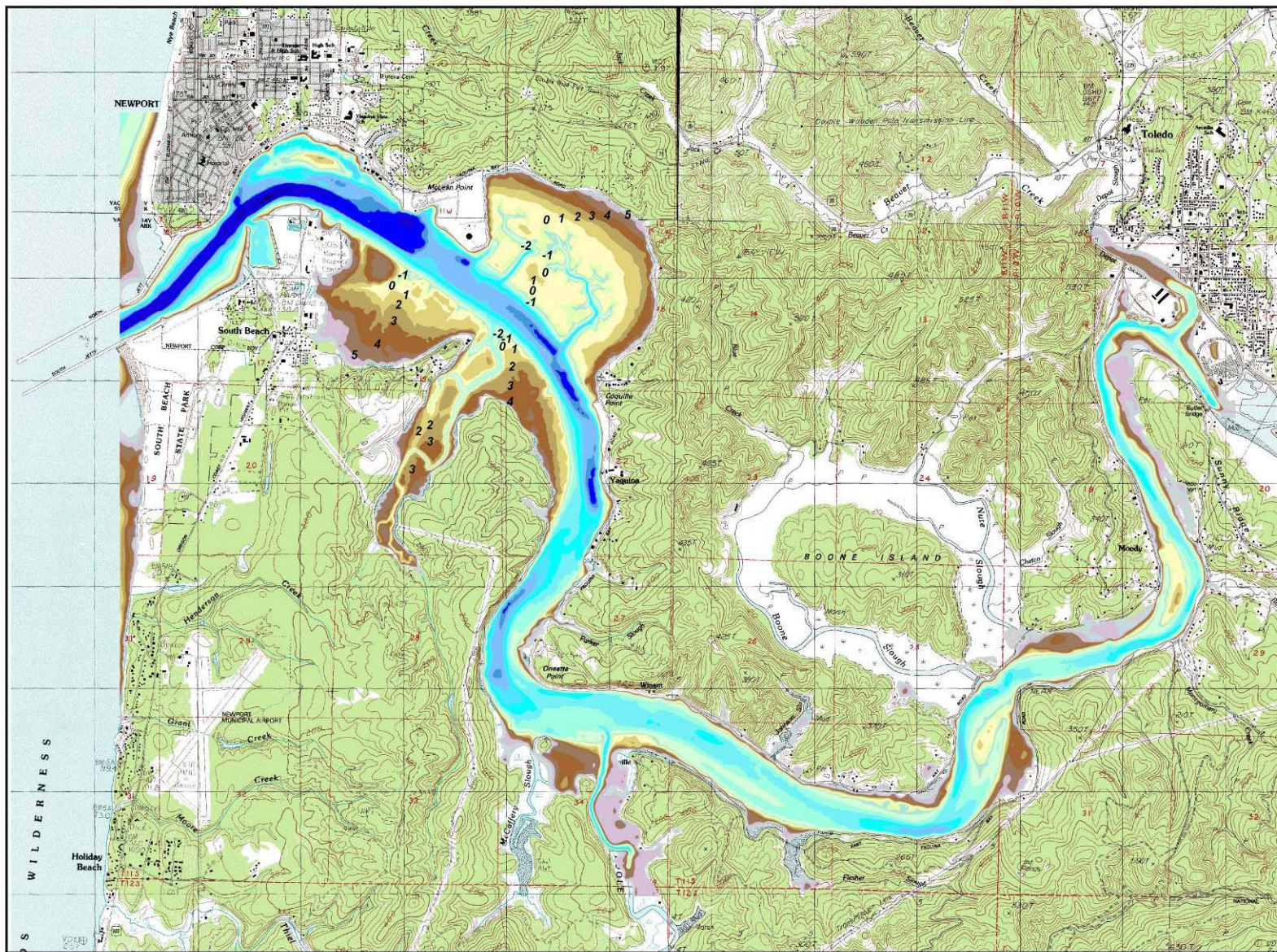
# Yaquina Bay Interpolated Bathymetry

Feet above MLLW

Intertidal



Subtidal

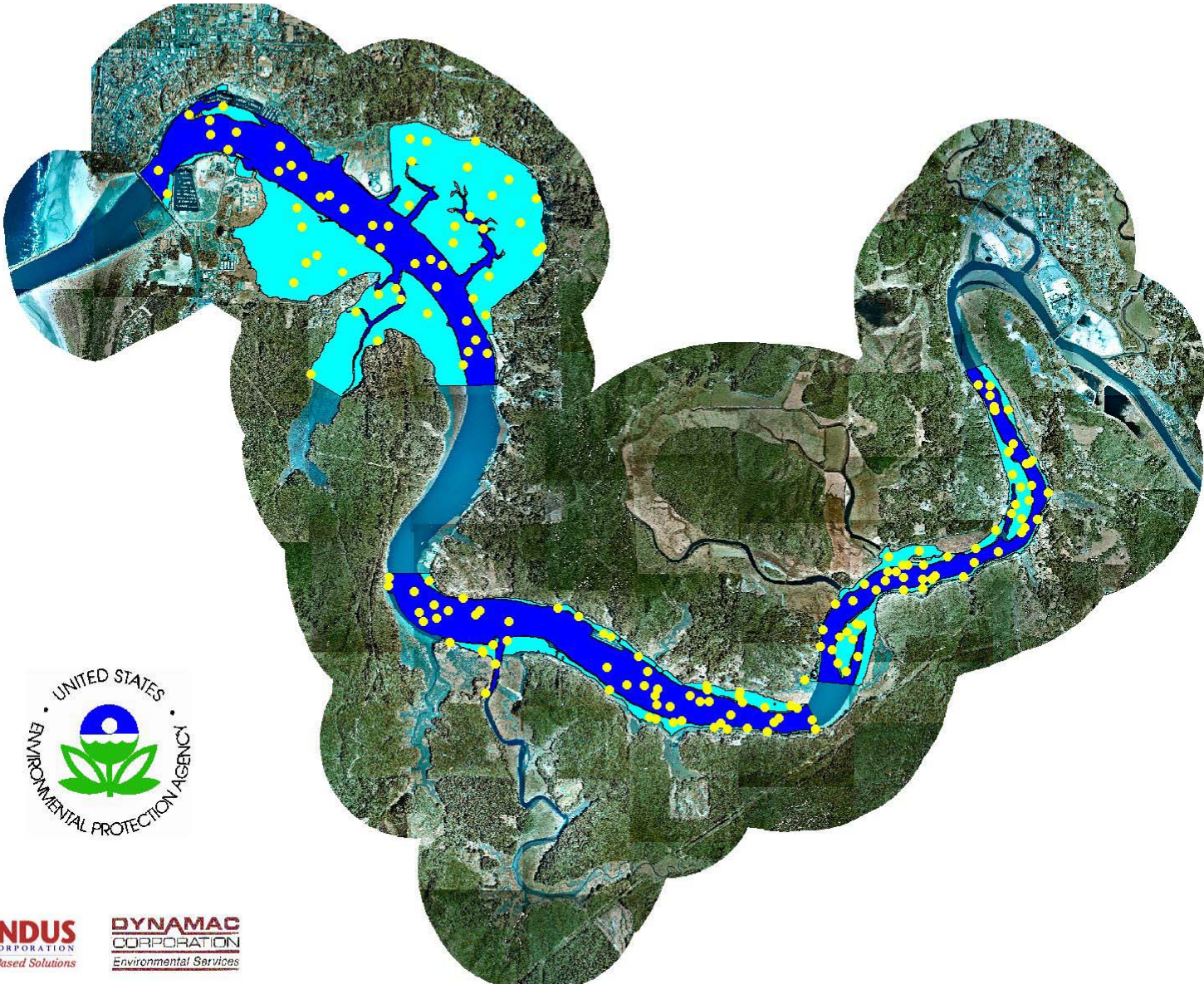


Source: USACE 1988, 1999  
2000, 2002; FDS 1989; NOS 1963;  
Base map - USGS DRC  
GIS - P. Clinton, INDUS Corp.



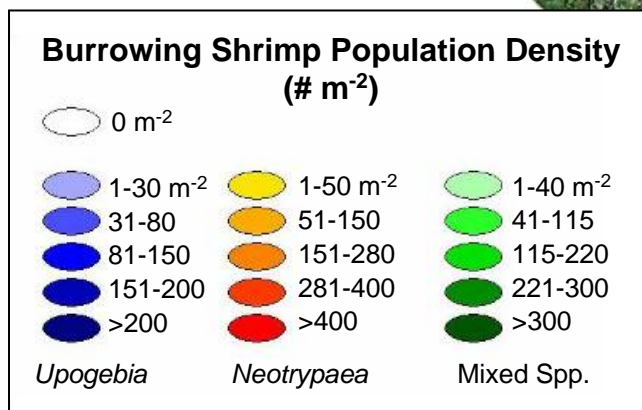
Examples of Benthic Habitat Data Sets (cont')					
Map Description	Year	Month	Habitat	Extent of coverage	West-East Landmarks
2. Benthic Invertebrate Abundance and Distribution					
Macro-infauna (>1.0 mm) species, abundance	1975-1979	various	Subtidal	lower estuary; limited area	HMSC Dock & SB Marina
Macro-infauna (>0.5mm) species, abundance, biomass	1998, 1999, 2000	July-Aug	Intertidal & subtidal	lower & mid estuary	SB Marina, OR Oyster docks
Macro-infauna (>0.5mm) species, abundance, biomass	2002, 2004	Feb, July, Oct	Intertidal & subtidal	whole estuary	Hwy 101 Bridge, Toledo Airport
Mega-infauna (>3mm) species, abundance	1999	Aug	Intertidal eelgrass	lower estuary; limited area	Sally's Bend
Mega-infauna (>3mm) species, abundance	2004	Sept-Oct	Intertidal & subtidal	whole estuary	Hwy 101 Bridge, Toledo Airport
Burrowing shrimp species, abundance	1999, 2002, 2004	various	Intertidal	whole estuary	Jetties, Toledo Airport
Amphipods (6 species)	1994, 1996, 1999	June-Aug	Intertidal	whole estuary	Hwy 101 bridge, Toledo
PICES database of Native & Introduced Species	N/A	N/A	all	whole estuary	N/A
Map Description	Year	Month	Habitat	Extent of coverage	West-East Landmarks
3. Benthic Vegetation Abundance & Distribution Data					
Z. marina and macroalgae biomass & %cover; Z. marina shoot density	1998-1999	June-Sept, monthly	Intertidal eelgrass	lower & mid estuary	Idaho Flats, Poole Slough
Z. marina, Z. japonica, macroalgae biomass and %cover	1999-2002	All	Intertidal	lower & mid estuary	HMSC, Poole Slough
Seagrass and macroalgae, percent cover	2000	July-Aug	Intertidal & subtidal	lower estuary	RM 1, RM 8
Z. marina cover, shoot density by type, macroalgae cover and volume	2001-2002	All	Intertidal eelgrass	lower & mid estuary	HMSC, River Bend
Seagrass cover & shoot density, macroalgae cover & biomass	2004	June	Intertidal	whole estuary	HMSC, GP mill (Toledo)

# Potential Random Sampling Sites for Intertidal & Subtidal Infauna Studies 2004/2005





# Burrowing Shrimp Populations in Yaquina R. Estuary (OR) Summer 2002



DeWitt, T.H., A.F. D'Andrea, C.A. Brown, B.D. Griffen, and P.M. Eldridge. 2004. Impact of burrowing shrimp populations on nitrogen cycling and water quality in western North American temperate estuaries. In: A. Tamaki (ed.), Proceedings of the Symposium on Ecology of Large Bioturbators in Tidal Flats and Shallow Sublittoral Sediments – from Individual Behavior to Their Role as Ecosystem Engineers. University of Nagasaki, Japan. pp. 107-118.

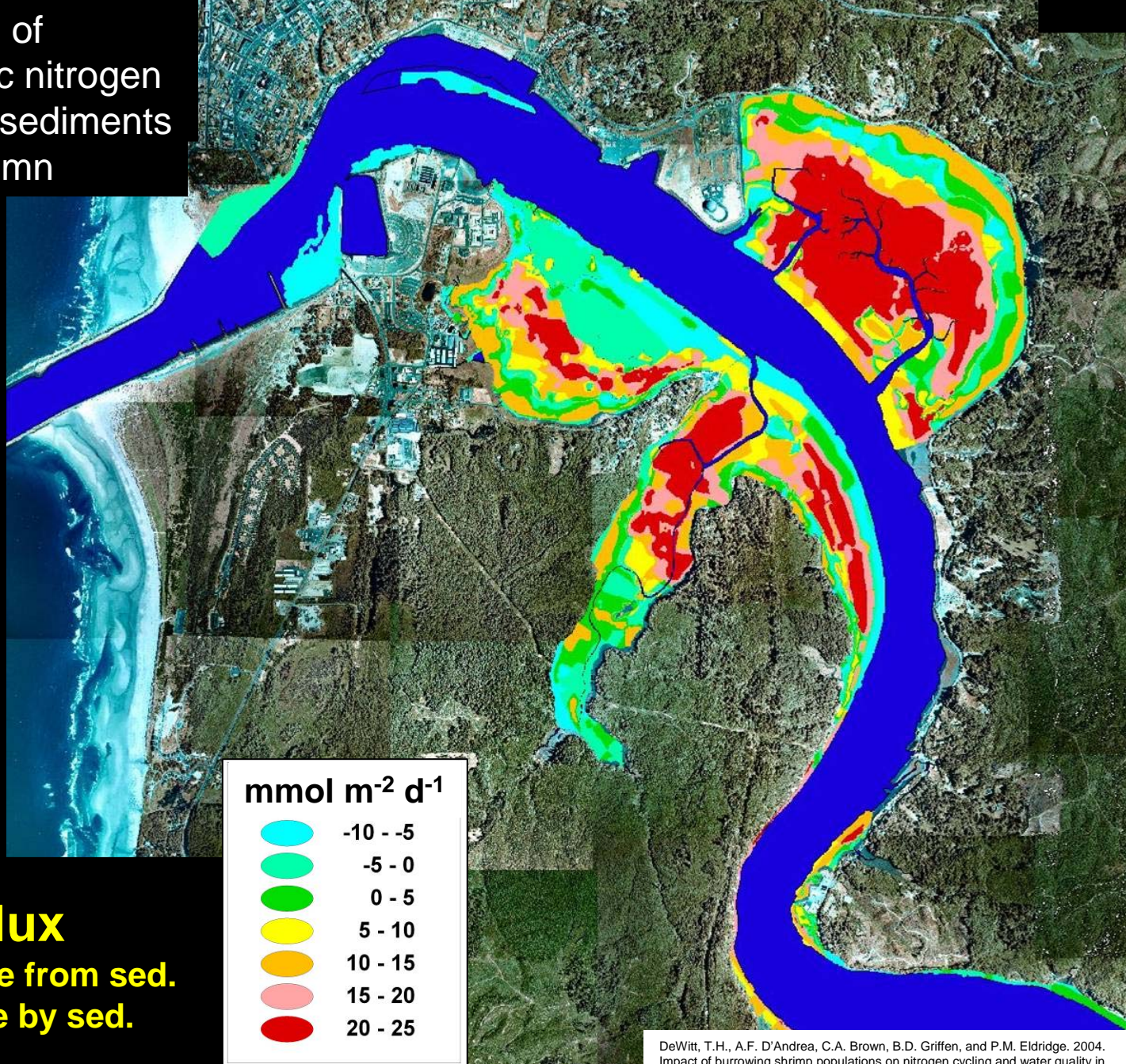




Interpolated fluxes of dissolved inorganic nitrogen between intertidal sediments and the water column

## DIN Flux

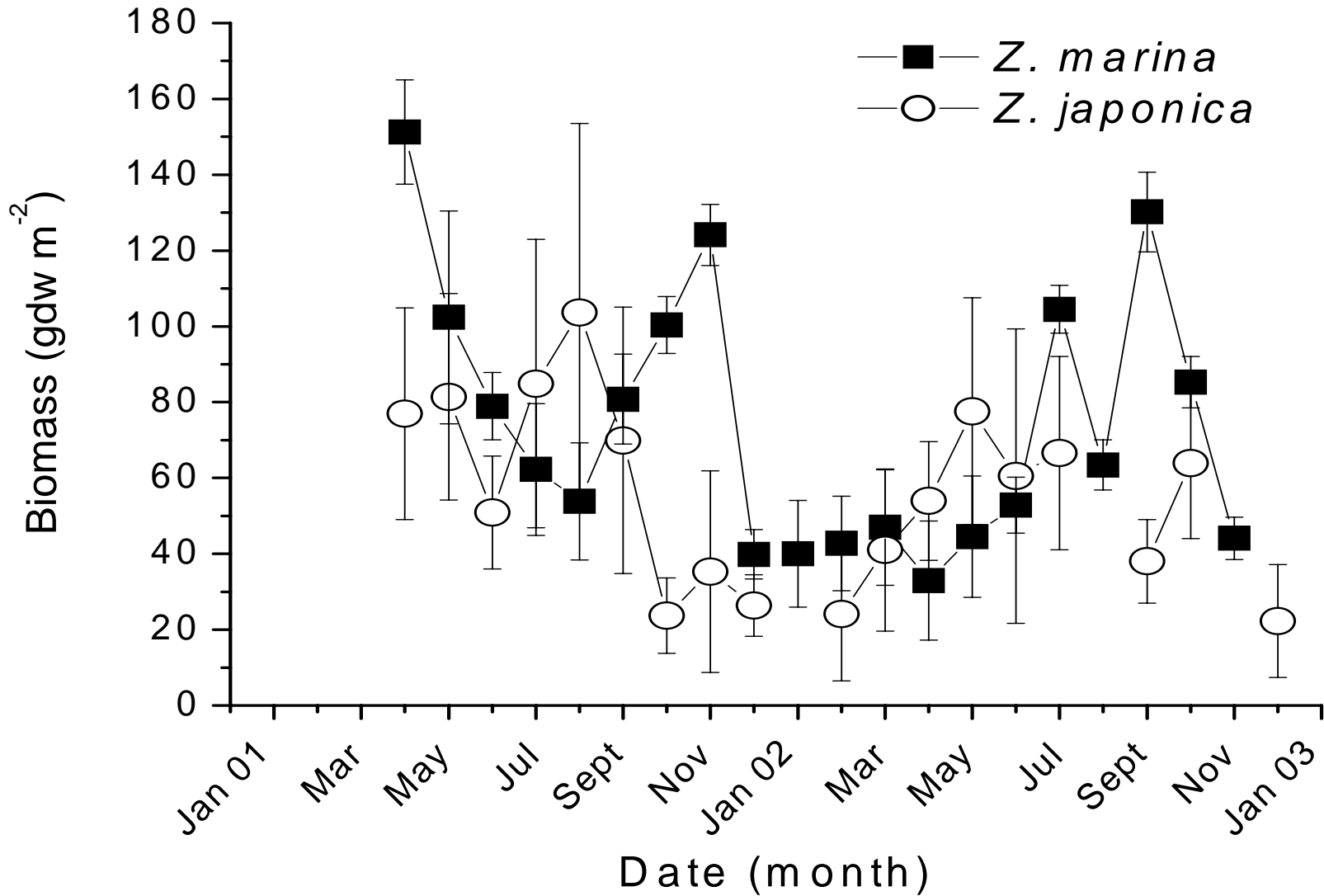
+ release from sed.  
- uptake by sed.



DeWitt, T.H., A.F. D'Andrea, C.A. Brown, B.D. Griffen, and P.M. Eldridge. 2004. Impact of burrowing shrimp populations on nitrogen cycling and water quality in western North American temperate estuaries. In: A. Tamaki (ed.), Proceedings of the Symposium on Ecology of Large Bioturbators in Tidal Flats and Shallow Sublittoral Sediments – from Individual Behavior to Their Role as Ecosystem Engineers. University of Nagasaki, Japan. pp. 107-118.



# Monthly Variation in Seagrass Biomass

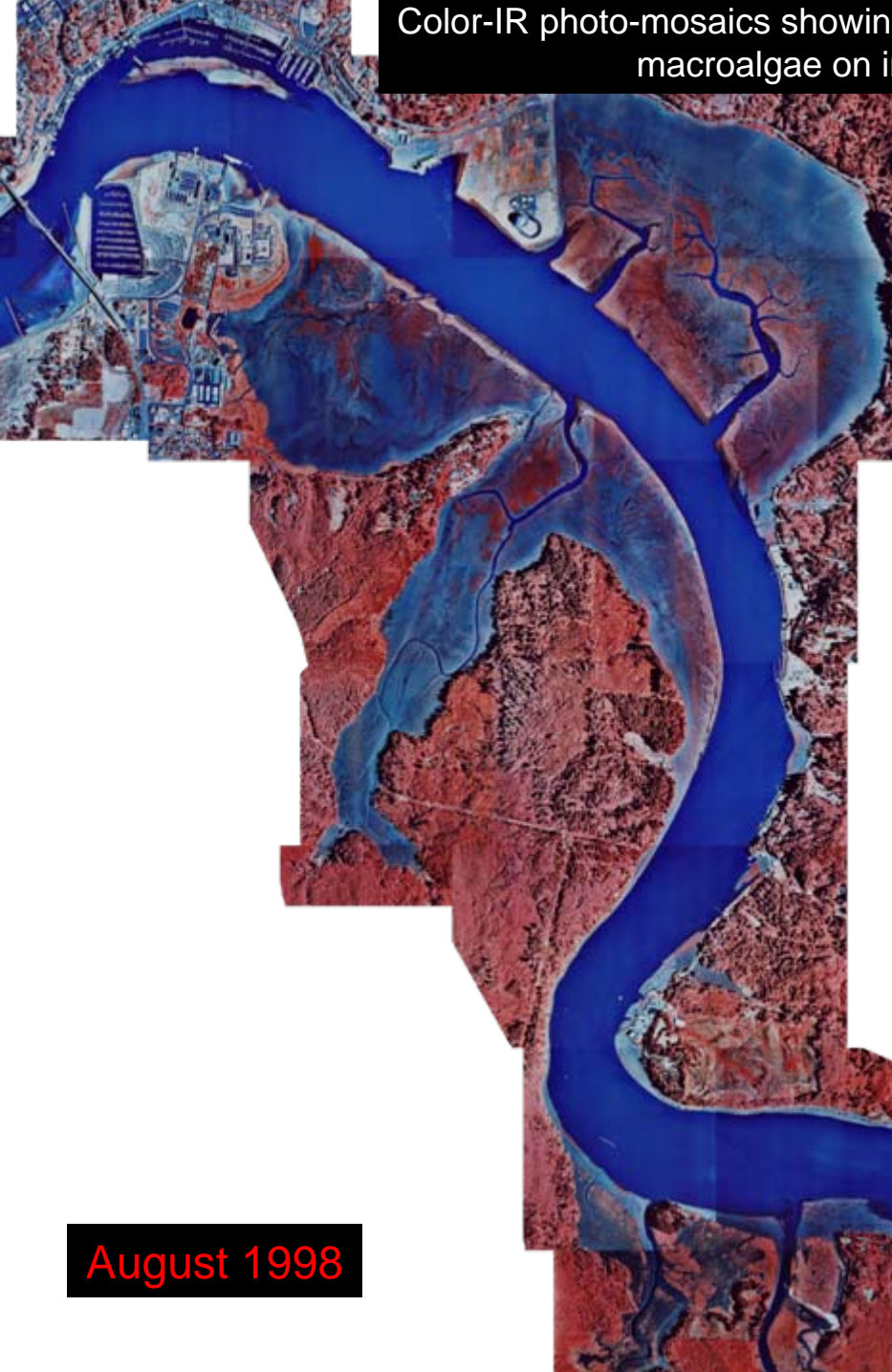


*Z. japonica* data from Kaldy, J.E. 2006. Production ecology of the non-indigenous seagrass, dwarf eelgrass (*Zostera japonica* Ascher. & Graeb.) in a Pacific Northwest Estuary, USA. *Hydrobiologia* 553: 201-217

*Z. marina* data from Kaldy, JE and KS Lee. Factors controlling *Zostera marina* L. growth in the eastern and western Pacific Ocean: Comparisons between South Korea and Oregon, USA. Submitted to *Aquatic Botany*.



Color-IR photo-mosaics showing seasonal variation in cover of seagrass and green macroalgae on intertidal mudflats of Yaquina estuary



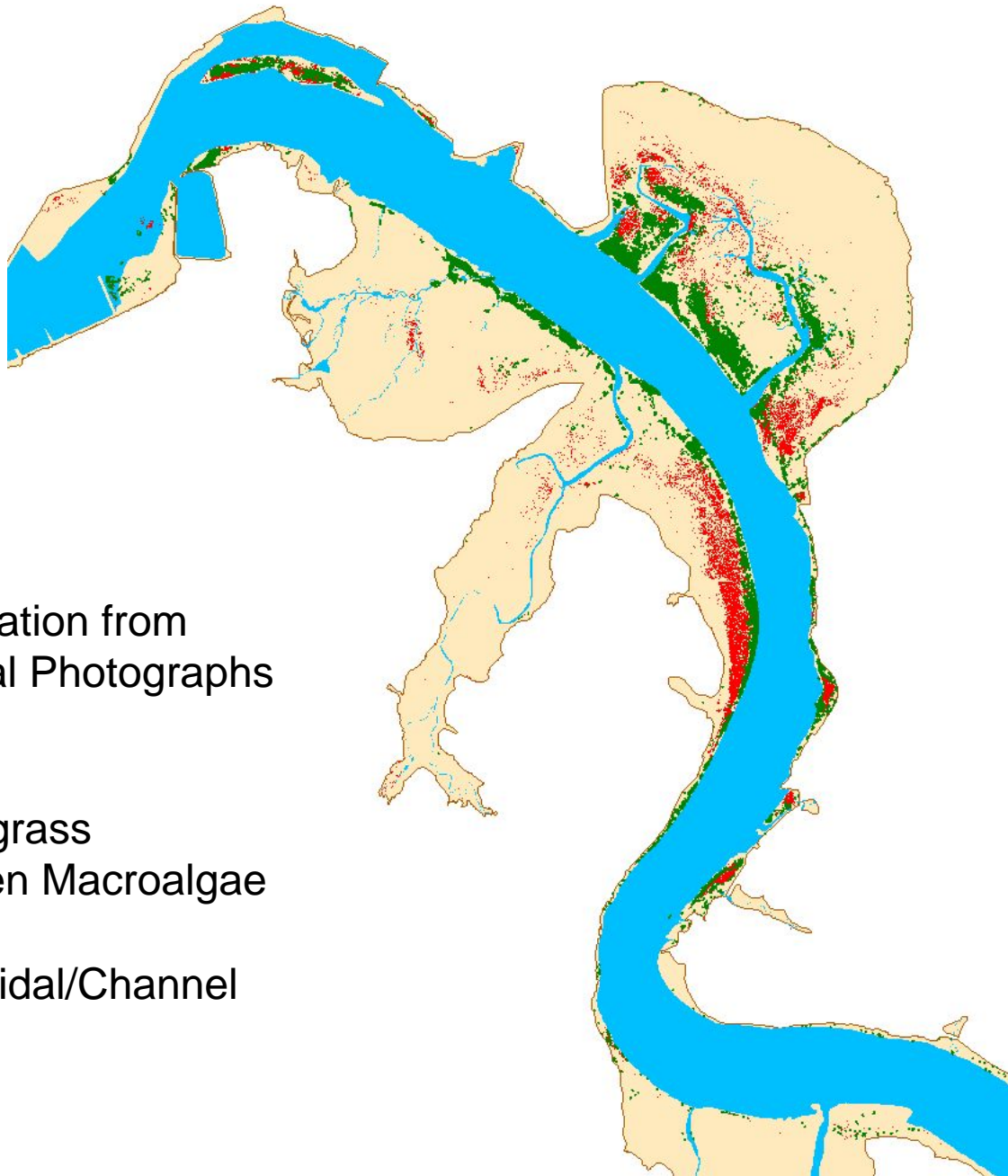
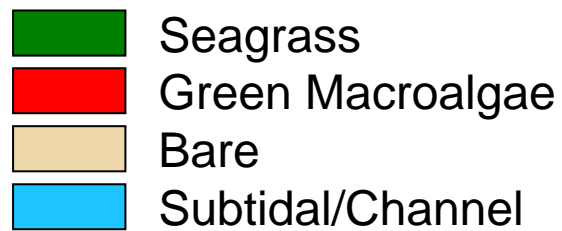
August 1998



May 2002

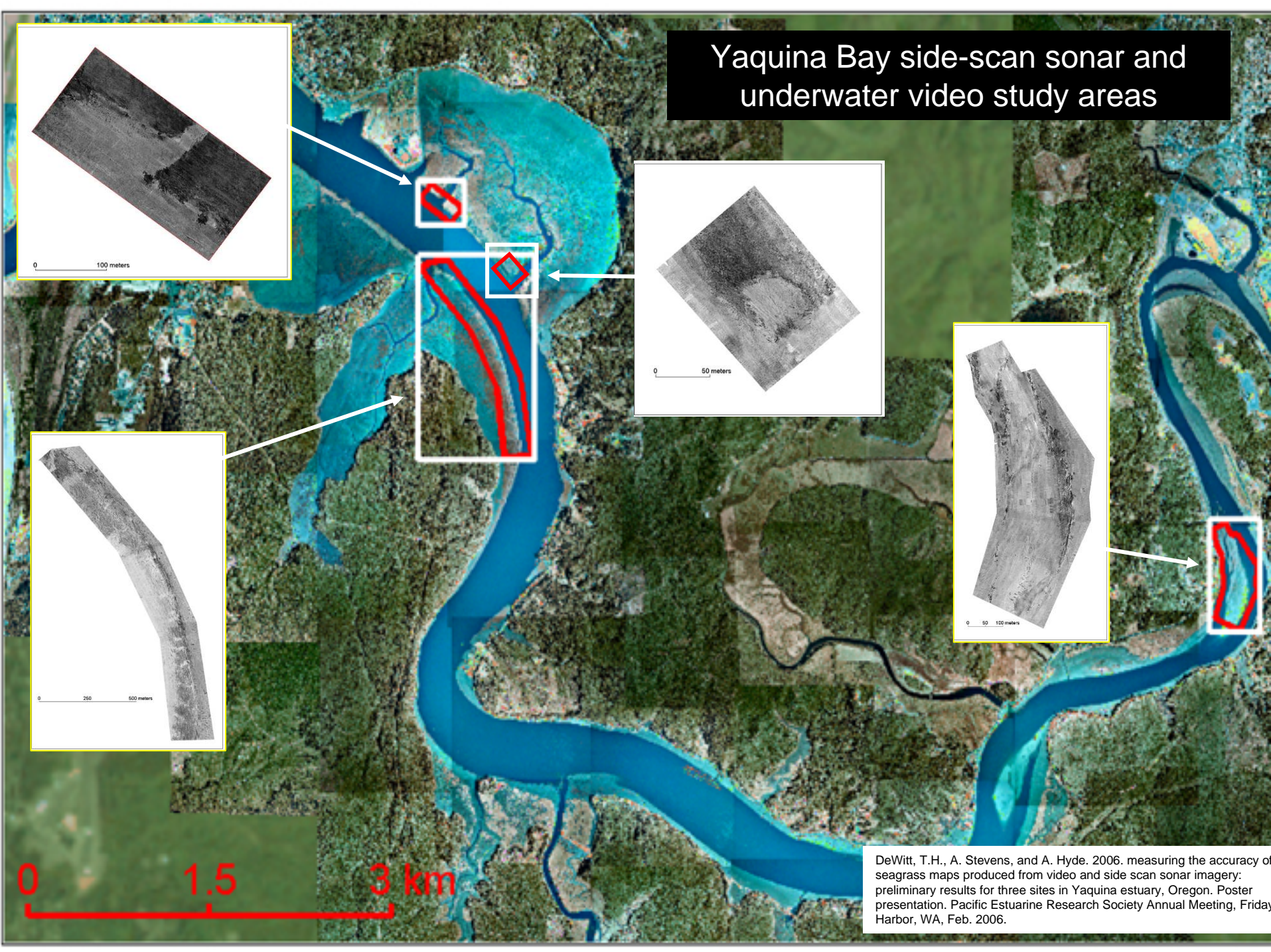


SAV Classification from  
Color IR Aerial Photographs  
1997





# Yaquina Bay side-scan sonar and underwater video study areas



DeWitt, T.H., A. Stevens, and A. Hyde. 2006. measuring the accuracy of seagrass maps produced from video and side scan sonar imagery: preliminary results for three sites in Yaquina estuary, Oregon. Poster presentation. Pacific Estuarine Research Society Annual Meeting, Friday Harbor, WA, Feb. 2006.



Examples of Benthic Habitat Data Sets (cont’)

Map Description	Year	Month	Habitat	Extent of coverage	West-East Landmarks
4. Benthic Habitat Characteristics Data					
Sediment grain size, TVS, metals, TOC	1975-1979	various	Subtidal	lower estuary; limited area	HMSC Dock, SB Marina
Sediment %sand, silt, clay	1996	July-Aug	Intertidal	whole estuary	Hwy 101 bridge, Toledo
Sediment grain size, water content, organic content	1998 - 2000	July	Intertidal & subtidal	lower & mid estuary	SB Marina, OR Oyster docks
Sediment grain size, water content, organic content	2002, 2005	May, Oct	Intertidal & subtidal	whole estuary	Jetties, Toledo Bend
Sediment grain size, salinity, temperature	2004	June	Intertidal	whole estuary	Jetties, Toledo Bend
Sediment temperature	1998-2006	All	Intertidal	lower & mid estuary	transects on various flats: Idaho Flat, Sally's Bend, Riverbend, Craigie Pt.



# Preliminary map of the %sand content of intertidal and subtidal sediments in Yaquina estuary

## Distribution of Sand

### Percent Sand

