Allison Bailey's Project Experience

Puget Sound Eelgrass Monitoring Site Transect Analysis Tools
Washington Department of Natural Resources. February 2007 – ongoing

Allison is currently developing several ArcGIS geoprocessing tools for Washington DNR's Submerged Vegetation Monitoring Project (SVMP). One tool will produce shapefiles from text files of eelgrass monitoring transect data and includes associated attributes for each sample point. Additional tools use the transect data to calculate and output statistical summaries of eelgrass area and depth ranges by transect, by site and by year. The tools are written in Python and will be provided through a custom ArcGIS toolbox. These tools will save DNR many hours of staff time by eliminating the need for tedious manual conversions, copying and pasting, and spreadsheet calculations.

Ranking Puget Sound Streams for Low Flow Enhancement – GIS Methodology and Tool Development
Washington Department of Ecology via ESA Adolfson. March 2007 – ongoing

Allison is currently developing a GIS approach and ArcGIS geoprocessing tools for testing Washington Department of Fish and Wildlife's (WDFW) "Draft Guidance for Ranking Puget Sound Streams for Low Flow Enhancement." The ranking methodology incorporates information about fish occurrence or potential, habitat value, hydrology, and flow/passage. For this pilot project, the approach and tools will focus on data and methods that are straightforward and easily transferable to watershed groups throughout Puget Sound.

West Coast Groundfish Essential Fish Habitat Environmental Impact Statement
NOAA, National Marine Fisheries Service. August 2002 – November 2006

Allison was the GIS lead for an assessment of Essential Fish Habitat (EFH) for West Coast Groundfish and development of an Environmental Impact Statement. Because of her skill in a geographic analysis and programming, combined with her experience in marine science, she was a key member of the scientific and modeling team. She created, synthesized, and analyzed datasets to develop a comprehensive GIS for groundfish including such diverse datasets as geologic habitat, species abundance, bathymetry, fishing effort, and non-fishing impacts. She worked closely with the client, presented project results to technical reviewers and stakeholders, and contributed to technical and policy documents. This project received a 'Special Achievement in GIS' Award from ESRI in 2004. The project also successfully informed policy decisions to protect esssential fish habitat (EFH) off the West Coast.

The Offshore Component of the Nature Conservancy's Marine Ecoregional Assessment
The Nature Conservancy. February 2006 – March 2007

To support the Nature Conservancy in extending their Pacific Northwest Coast (PNWC) ecoregional assessment into the offshore waters, Allison investigated the utility of National Marine Fisheries Service's (NMFS) groundfish trawl survey data as input into the TNC's conservation planning and prioritization process. She evaluated appropriate spatial scales and multiple metrics for input into MARXAN, one of TNC's conservation modeling tools.

Oil Spill Response Atlas for Puget Sound and Straits of Juan de Fuca
Concurrent Technologies Corporation (CTC). November 2005 – May 2006

CTC developed a web-based application for marine oil spill responders in Puget Sound and the Straits of Juan de Fuca, Washington. To support this application, the 20-year-old paper maps depicting sensitive biological and human resources were updated with current data in GIS format. Allison provided GIS and biological expertise to compile and develop data into a geodatabase that is consistent with NOAA's Environmental Sensitivity Index (ESI) mapping protocol. She used her extensive experience with marine GIS data to quickly filter through existing data sets and identify strengths and limitations of these data. Allison automated data processing with Python scripts, using ESRI's geoprocessing commands, and SQL commands. Allison was also responsible for mentoring CTC's GIS staff working on the project. As a supplemental product, Allison developed a logical and physical geodatabase data model for a Geographic Response Plan.

Essential Fish Habitat Bayesian Network Model
Marine Resource Assessment Group (MRAG). May – November 2005

MRAG and University of Reading have developed a Bayesian Network (BN) model to delineate West Coast groundfish habitat for 82 species. Allison developed automated routines to consolidate and format spatial data input for the model. In addition, she automated the process for incorporating model output data into GIS and generating maps for over 160 groundfish species and lifestage combinations. Interaction between the GIS data and the model was smooth and seamless and allowed for multiple re-runs of the model and updates to the map to occur during interactive scientific review meetings. Allison and others in the EFH team presented these models, data sources, and model output for numerous reviews by scientific, statistical, and other advisory committees of the Pacific Fishery Management Council.

Aquatic Vegetation Surveys
Envirovision Corporation. July – November 2005

Allison provided GIS support for Envirovision's aquatic vegetation surveys. This support included processing and conversion of GPS field data, delineation of aquatic plant boundaries using survey data and bathymetry data, bathymetric surface modeling, cartography and map production, and data documentation. She developed a GPS data dictionary for future surveys and provided guidance to increase efficiency of survey data collection and facilitate transfer from field survey formats to GIS formats.

Washington Coastal Kelp Data Consolidation
Washington Department of Natural Resources. June – September 2003, May – June 2005

Washington DNR has a time-series of imagery delineating kelp beds off the Washington coast. In order to use these data for management and analysis, they need these data converted to a common, consistent GIS format. Allison developed raster-to-vector data conversion scripts, performed QC, documented methods, and provided technical oversight and support for delegated tasks.

Stormwater Infrastructure Inventory and Database Development
City of Tukwila. May – October 2003

Allison developed an automated approach for converting the City of Tukwila's point-based GPS inventory of stormwater infrastructure into an inter-connected linear network of pipes with associated tabular information. She created scripts in AML, Perl, and Python that use the surveyed azimuth of each catch basin's incoming and outgoing pipes to find the most likely catch basin or drain point to connect to. When these data were thoroughly reviewed, the automated approach was correct approximately 80% of the time. This technique saved many hours of tedious, manual digitizing to connect these points.

Snohomish County Drainage Needs Report
Snohomish County Surface Water Management. July 2001 – December 2002

To support this complex surface water assessment, modelling, and analysis project, Allison developed AML, Perl, and Python scripts to synthesize current and future land-use, zoning, parcel, and hydrologic data for hydrologic modelling throughout multiple sub-basins in Snohomish County. Data output from GIS spatial analysis were provided to modellers in an ASCII format that were seamlessly input into an HSPF model. She also developed scripts for managing and processing field-collected survey data, which included quality control methods to provide feedback to surveyors. Allison also supported spatial data development for hydraulic models (HEC-RAS).

Assessment of Anthropogenic Changes to Marine Habitats in Fidalgo Bay
Washington Department of Fish and Wildlife. May – December 2002

GIS was used to quantify changes to nearshore marine habitats and habitat functions resulting from historic anthropogenic changes such as dredging, filling, diking, and shoreline armoring. Allison assembled existing GIS data layers for current conditions including shoreline, bathymetry soundings, marine vegetation, fisheries habitat surveys, dredged areas, and artificial shoreline substrate. Current and historical bathymetry soundings were converted to surface models in both Tin and Grid formats. She performed GIS overlay analysis of the shoreline, bathymetry, natural resource and impact data to quantify the changes by depth strata. In addition, Allison developed batch mapping programs in VBA for ArcGIS to create a map series for the report.

Virtual Transects: GIS-Based Assessment of Floating Kelp Beds
NOAA, National Marine Fisheries Service. October 1999 – May 2000

Allison, supported by a scientific programmer, developed a novel method for delineating and estimating the length of shoreline associated with offshore kelp beds. Input GIS data included kelp bed polygons, and coastline arcs. This project developed an automated, repeatable, and intuitive approach for associating offshore features (kelp beds) with corresponding sections of shoreline. Various techniques were tested for projecting a line from regular sampling points along the shore in a way that would be both systematic and representative of a biologist's intuitive interpretation of 'offshore'. As an indicator of fisheries habitat value, this technique was used to quantify the percentage of West Coast shoreline that has offshore kelp beds. Project

results were presented at the Sixth International Conference on Remote Sensing for Marine and Coastal Environments.

West Coast Groundfish Management
NOAA, National Marine Fisheries Service. March 1998 – June 2001

Allison served as the sole GIS Analyst supporting a division of scientists dedicated to U.S. West Coast Groundfish fisheries management. Tasks included GIS data development, data conversion, spatial data analysis, database design and development, GIS programming (AML, Avenue, Perl), and extensive automated map production using Avenue and AML. She supported stock assessment, groundfish trawl sampling design and data collection, seafloor mapping and habitat investigations, and the Essential Fish Habitat (EFH) process.

Nearshore Habitat Inventory of Puget Sound
Washington Department of Natural Resources. June 1990 – March 1998

This multi-year inventory incorporated remote-sensing, GIS, and field sampling to assess and monitor the long-term health of the marine and estuarine environment in Puget Sound, Washington. Allison was responsible for field sampling design and field data collection for physical and biological intertidal habitat mapping using aircraft remote-sensing, GPS, and GIS technologies. She also developed a GIS-compatible database to store and analyze field data for the inventory. In addition to the full-scale, synoptic inventory, she also performed a rapid, probability-based survey of Puget Sound nearshore habitats and presented results of this survey at the 1998 Puget Sound Research Conference.

Sub-pixel Analysis of Invasive Species in Coastal Wetlands
Delaware Department of Natural Resources. September 1995 – October 1997

Allison designed and completed this research project to assess the capabilities of a new satellite image analysis approach, sub-pixel analysis, to detect and quantify the extent of an invasive species, *Phragmites australis*, in Delaware's coastal wetlands. In parallel, she used multi-year aerial photo interpretation to map *Phragmites* extent and to quantify changes in its distribution over time. Results from this study were provided to Delaware state wetland managers in order to assist in assessing their management practices and invasive species control program.