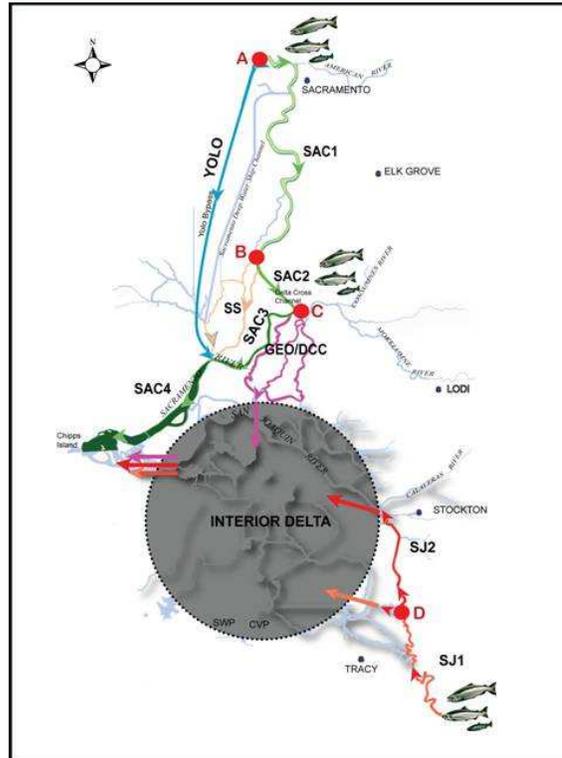


## The Delta Passage Model: Estimating Smolt Survival Through Multiple Migration Pathways

The Sacramento-San Joaquin Delta is a labyrinth of channels, and recent studies have found that the survival of outmigrating Chinook smolts is highly dependent on the channels fish use during their migration. Cramer Fish Sciences synthesized estimates of route selection probabilities and reach-specific survival from multiple studies and linked them to data on flows, tides, and water diversions in the Delta. This effort has resulted in the Delta Passage Model, which provides new insights on how water management actions influence smolt survival. The model has recently been applied to the planning and assessment of several Delta projects. The modeled reaches are shown in this diagram [click the diagram



for a larger view], and a detailed description of the Delta Passage Model is available in a downloadable report [PDF] by CFS scientists Brad Cavallo, Paul Bergman, and Jenny Melgo: [The Delta Passage Model](#)

## Using DNA to Detect the Presence of Aquatic Species

Cramer Fish Sciences has been developing DNA barcodes and qPCR assays to detect the presence and relative abundance of cryptic aquatic species. [Genidags](#), a new division of Cramer Fish Sciences, is dedicated to the further development and use of these powerful genetic tools.

Look for a paper with the title "TaqMan assays for the genetic identification of delta smelt (*Hypomesus transpacificus*) and Wakasagi smelt (*Hypomesus nipponensis*)" in an upcoming issue of the journal [Molecular Ecology](#).

## Flatfish and Rockfish and Lamprey

CFS scientists gave four presentations at the Oregon AFS annual meeting in February, including one regarding Marine Protected Areas and one regarding Pacific lamprey:

- [Can Data Collected from Marine Protected Areas Improve Estimates of Life-History Parameters?](#) [PDF] by Tommy Garrison - results of a study Mr. Garrison conducted while at the University of Washington. Look for a paper with the same title in an upcoming issue of the [Canadian Journal of Fisheries and Aquatic Sciences](#).
- [Migration Behavior and Distribution of Pacific Lamprey in the Willamette Basin](#) [PDF] by Shadia Duery - initial results of a tagging and tracking effort in collaboration with the Confederated Tribes of Grand Ronde and Oregon State University. Research is ongoing.