

# PROJECT CROOS

## Collaborative Research on Oregon Ocean Salmon

[www.PacificFishTrax.org](http://www.PacificFishTrax.org) & [www.projectCROOS.com](http://www.projectCROOS.com)

### Genetic Stock Identification Project Summary *(as of June 1, 2010)*

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Project CROOS applies genetic stock identification techniques to study at-sea distribution patterns and migratory timing of Chinook salmon stocks encountered off the coast of Oregon. Fish harvest locations and fishing effort data are collected at precise spatial and temporal scales. Stock composition in mixed-stock fishery samples and assignment of individuals to specific regions or rivers are estimated by applying the Genetic Analysis of Pacific Salmonids (GAPS) standardized microsatellite baseline<sup>1</sup>. These results can be used by fisheries managers to guide decisions aimed at reducing harvest of stocks of concern. In partnership with Oceanography researchers at Oregon State University, individual stock of origin estimates are being coupled with physical oceanographic conditions to investigate factors that contribute to Chinook distribution. Methods are being developed to determine if individual stocks are more closely associated with their river cohorts than with other stocks. Additional research includes the genetic basis of migratory timing and navigation of adult Chinook salmon. More information on genetic research can be found at <http://marineresearch.oregonstate.edu/genetics/index.htm>

#### Progress

- ⇒ Over 550 Chinook salmon were sampled off the coast of Oregon during May, 2010. Of these, 377 were genotyped and analyzed.
- ⇒ ~8000 Chinook salmon samples were collected off the coast of Oregon during 2006 and 2007. Of these, ~7200 were genotyped and analyzed.
- ⇒ Other collaborative projects include: NOAA Northwest Fishery Science Center research cruises (2008); dock-side sampling and genotyping Chinook salmon harvested in the Cape Falcon, OR to Leadbetter Point, WA commercial and recreational fisheries with Oregon Department of Fish and Wildlife, Washington Department of Fish and Wildlife, and the Columbia River Inter-Tribal Fish Commission (2008); analysis of Chinook salmon incidentally caught in the Pacific Whiting fishery (2008 and ongoing 2009).
- ⇒ Due to the complete closure of commercial troll Chinook fishery south of Cape Falcon, Oregon, there was no at-sea sample collection in 2008 or 2009.

#### Results to Date

- ⇒ Harvest locations, fishing effort, and genetic mixed stock analysis results indicate stock composition and distribution varies substantially over space and time.
- ⇒ A detailed report on genetic findings by Project CROOS for years 2006-2007 can be found at <http://www.pacificfishtrax.org/about-us/reports-and-publications>.
- ⇒ A report on Chinook salmon incidentally caught in the Hake fishery is available on Pacific Fish Trax website.
- ⇒ The current standardized microsatellite genetic baseline contains over 28,000 fish from known populations.
- ⇒ Stock of origin estimates can be provided within 24 - 48 hours of receipt of samples to the laboratory.
- ⇒ Project updates will be made available throughout the season via the website [www.pacificfishtrax.org](http://www.pacificfishtrax.org)

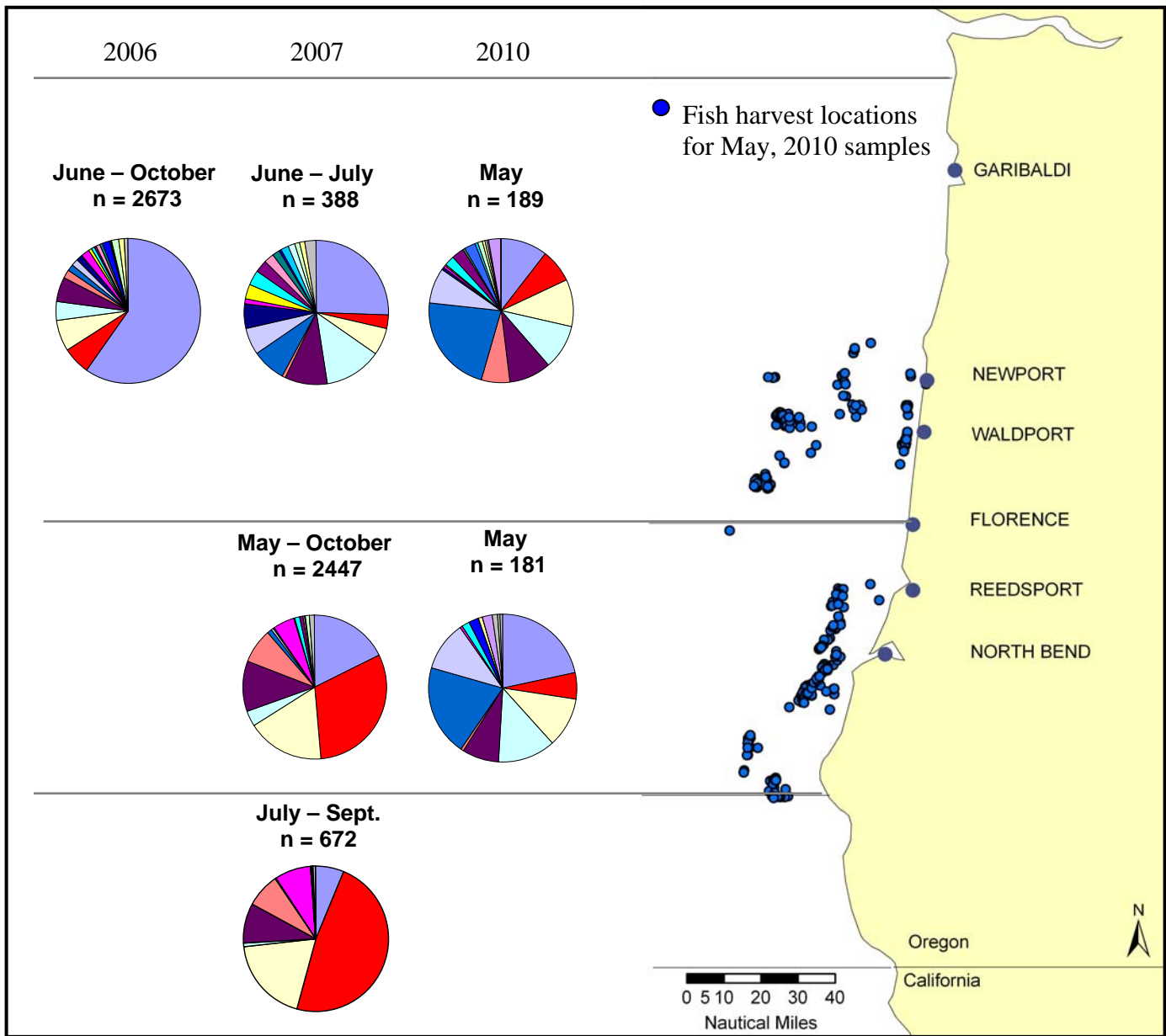
#### Future Actions

Project CROOS is conducting at-sea sampling from May to September, 2010. The GAPS consortium is working to develop a Chinook salmon baseline utilizing a new class of markers, SNPs (single-nucleotide polymorphisms). SNPs hold promise to improve high throughput and reduce genotyping costs.

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<sup>1</sup> Primary funding for the GAPS baseline was provided by the U.S. Department of Commerce, NOAA, NMFS, funds appropriated to the U.S. section of the Pacific Salmon Treaty. We thank the GAPS consortium for valuable guidance and advice, and for collaboration on sample sharing and baseline construction.

Figure 1. Chinook salmon stock mixture composition for 2006 (a), 2007 (b), and 2010. Yearly stock compositions were calculated using the average of all monthly stock mixture proportions estimated with GAPS baseline v 2.1 and program ONCOR (Kalinowski, <http://www.montana.edu/kalinowski/Software/ONCOR.htm>). Stocks that contributed to a minimum of 1% in any mixture in any fisheries management zone are shown in the key below.



### Stock Key

- |                           |                       |
|---------------------------|-----------------------|
| Central Valley fall (fsp) | L Columbia R. sp      |
| Klamath R.                | Deschutes R. fall     |
| Rogue R.                  | Snake R. fa           |
| U Columbia R. su/fall     | N Puget Sound         |
| Mid Oregon Coast          | Hood Canal            |
| N California/S Oregon     | Central Valley spring |
| Mid Columbia R. tule      | Mid Fraser R.         |
| L Columbia R. fall        | S Thompson R.         |
| S Puget Sound             | N Oregon Coast        |
| California Coast          | L Fraser R.           |
|                           | Stocks <1%            |