

Identified actions/needs from the Forage Fish Workshop, Newport OR, October 10, 2019. Contact info: Jim Rivers: jim.rivers@oregonstate.edu

Group 2	Group 3	Group 4	Group 5	Group 7	Group 8
well-defined questions addressing needed information	literature review of: existing datasets, survey/sampling efforts (geographic/temporal), questions, data gaps	go to grey literature (theses/dissertations), develop databases (what we know to date)	mapping spatial, temporal distribution and abundance of forage fish community at a variety of scales	Long-term collaboration (has to be first to get the other parts going), including tribal nations	CICED = Cooperative Innovative Coastal Ecosystem Dynamics
Develop and expand on social constituency	engage with broader community (i.e., skillsets beyond researchers/biologists); key limiting factor is technology (tap into tech community for solutions that may already exist)	Develop proposals: multi-agency/inter-disciplinary, ID funders and stakeholders, involve users (e.g., citizen scientists/fishermen --> fish stomachs for diet analysis)	Determine mechanisms/population dynamics: what are the key drivers, top-down vs. bottom-up processes	Long term monitoring: (1) develop direct sampling techniques for adult nearshore forage fish [in summer], (2) develop direct sampling for nearshore forage fish spawning (water column), (3) find and map beach spawning species (following WA)	develop sampling techniques to characterize FF in nearshore zone
Research objectives (in order): nearshore purse seining, monitoring of diet in surrogate species (cooperate with fisherman for stomach contents work), expand the utility of NANOOS	continue workshops, continue to make connections (common goals/interests) for funding	Studies focused on forage fish quality, energetic content (fine scale and intensive time series)	Ecosystem-scale modelling/research within the NCC (not species-specific, community-level modeling of forage fishes)	explore new techniques (eDNA, hydroacoustics, predator stomach content, drone sample/survey)	Develop research initiative focused on FF in nearshore zone (i.e., GLOBEC)
	Explore nearshore acoustics (for forage fish, with ground-truthing)	Technology (LiDAR, acoustics, drones, smaller tracking tags with new on-board measurements)	Expand/integrate/compare with other regions within Pacific (NCC isn't alone, other systems may have connections/lessons to be learned)	trove of information on nearshore species in local knowledge and gray literature that can be tapped into	potentially use herring as an indicator species for broader fish community in the NCC
			Get focal groups interested (salmon anglers, whale watchers, birders) that are influential and have \$		to what extent is top down forcing influence the FFC in the NCC
			Formation of a forage fish working group (as a springboard from the workshop)		Funding: BOEM, NOAA, NSF, MSI, partners: UW, industry, Ainley (note there is a report out from central CA workshop led by Ainley)