Citizen Science Herring Spawn Data Sheet

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Email/hardcopy send with photos to Anne Shaffer anne.shaffer@coastalwatershedinstitute.org, CWI, and Todd Sandell, WDFW; todd.sandell@dfw.wa.gov; Questions call Anne Shaffer 360.461.0799 *Note: Quadrat should be square, 0.5 meter on a side. Sampling: Estimate percent of total quadrat that has herring eggs. Quadrat Photos: please include at least 3 quadrat photos. In each include a square of paper with visibile photo id number that corresponds to quadrat number recorded on data sheet) Name/Email/Phone:

Date:			Notes:			_
Location:	Site name:		-			
	Latitude:		-			
	Longitude:		_			
White water	<u>Photos</u>	Date and time	Number taken	<u>Latitude</u>	<u>Longitude</u>	<u>Notes</u>
	Panorama:					
	Point:					
	Drone:					
	Shoreline length o	f whitewater (number o	f paces):			
	Number of paces p	per 10 feet (estimate):				
On the ground	<u>Photos</u>	Date and time	Number taken	<u>Latitude</u>	<u>Longitude</u>	
	Panorama:					
	Point:					
Quadrat* numbe	<u>Latitude</u>	<u>Longitude</u>	Vegetation type	% cover eggs	Pictures?	

Examples of herring spawning events: aerial views

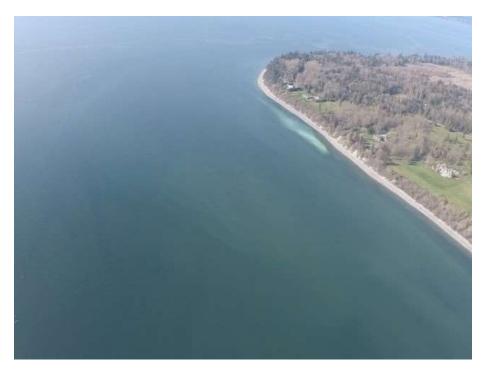
[Note: Herring spawn in Puget Sound mainly from January-April. One unusual stock spawn in central basin later in April, and the Cherry Point stock (Strait of Georgia) spawns very late, in April-mid June. Events similar to the ones depicted below occurring during other parts of the year are likely shellfish or other forage fish (smelt, sandlance) spawning events]

		=Spawning			=Peak				= Shift since 2012														
BASIN	STOCK		Jan	1	Fe	eb			Ma	rch	1		Ap	ril			Ma	ay			Ju	ne	
	Squaxin Pass																						
South Puget	Purdy																						
Sound	Wollochet Bay																						
	Quartermaster Harbor																						
Central	Elliott Bay																						
Puget Sound	Port Orchard-Port Madison																						
Whidbey Basin	Port Susan																						٦
	Holmes Harbor			Т																			
	Skagit Bay																						
	South Hood Canal																					\square	٦
Hood Canal	Quilcene Bay																						
	Port Gamble																						
Strait of	Kilisut Harbor			Т																			٦
Juan de	Discovery Bay																						
Fuca	Dungeness/Sequim Bay																						
San Juan	Interior San Juan Islands																						
	NW San Juan Island																						
Islands/	Fidalgo Bay																					\square	
Strait of	Samish/Portage Bay																					\square	
Georgia	Semiahmoo Bay																						Τ
("North")	Cherry Point		\top																				

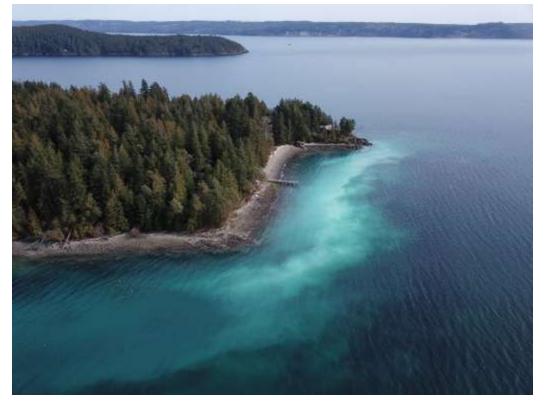
DOCUMENTED AND PEAK SPAWNING TIMES FOR WASHINGTON HERRING STOCKS



Above: Pt Whitehorn spawn 2019. Note turquoise water color- aka "whitewater"



Above: Small spawning event at Birch Head 2019



Jackson cove drone footage, Hood Canal, 2019 (extremely heavy spawn, rare in Puget Sound)



Above: small "spot spawn" at Pt Whitehorn, 2019 (picture taken from the bluff)



Above: Discovery bay spawn 2017

Examples of **false herring spawn events** (often these are wave action mixing up shoreline sediment, rainfall runoff point sources creating off-color plumes, or sometimes phytoplankton blooms. Clams and

other benthic organisms also have large scale, coordinated spawning events that can resemble herring "whitewater".



Above: SJI- algal (phytoplankton) bloom in upper left. Note greenish cast. Also, herring spawn on aquatic vegetation in the nearshore (0-20 feet in general), so events in deep water are unlikely to be herring spawn, as are events on sandy spits with no vegetation present (plumes in these locations tend to be generated by wave action).



Above: Wave action along left (South) side of Mud Bay, SJI. Not herring spawn.



Above: false spawn near Lopez ferry dock, SJI. Likely a sediment plume caused by stormwater runoffunusual to see the center of herring "whitewater" extend out into deeper water than either of the edges.



Quadrat (0.5m per side).







Herring eggs on *Gracilaria spp*, east Discovery Bay Strait of Juan de Fuca 12 April 2019. Photo by Dave Parks and CWI. All rights reserved.