

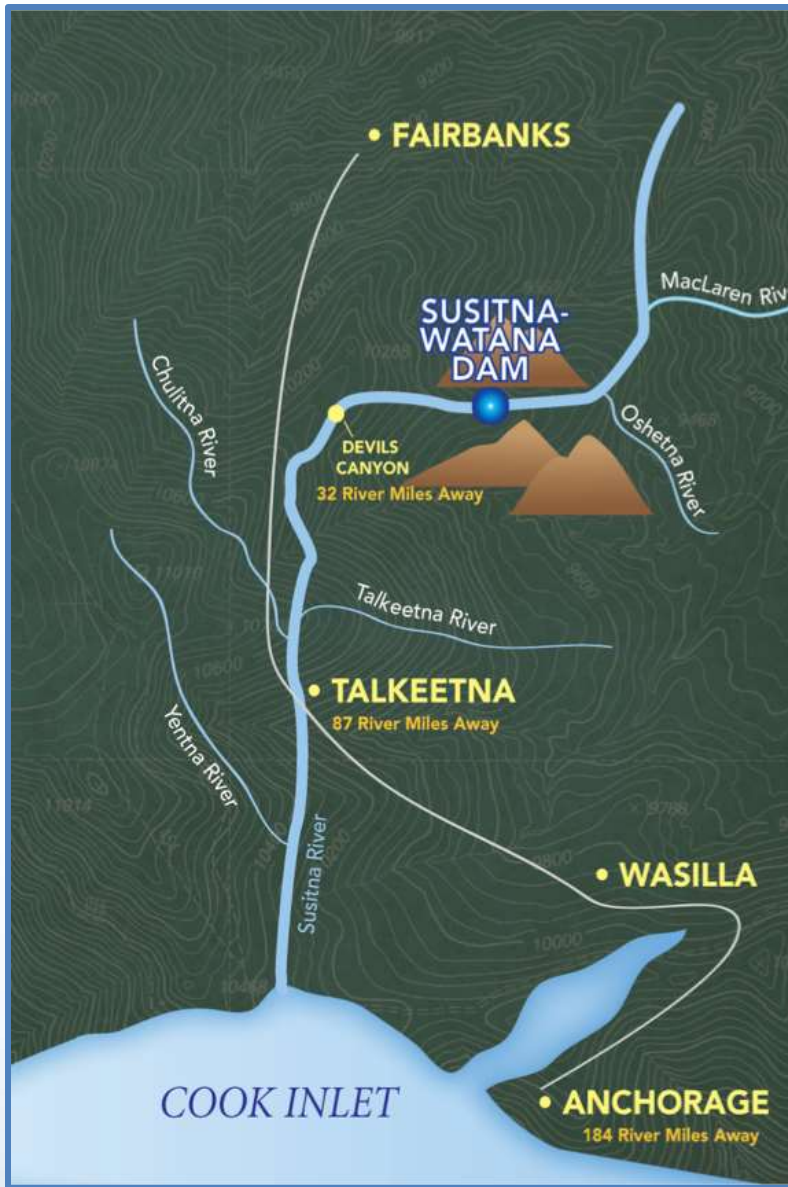
Technical Team Meeting

Study 8.5

IFS Winter Studies Update

20 March 2014

Prepared by
R2 Resource Consultants




SUSITNA-WATANA HYDRO *Clean, reliable energy for the next 100 years.*

Study 8.5 IFS Winter Studies – Update

- Winter instream flows are important component of fish habitat:
 - Ice cover for 6-7 months of the year
 - Incubation period/Incubation rate (ATU)
 - Low flow period
 - Limited habitat availability and restricted access
 - Cold surface water temperature
 - Dewatered channel area exposed to below freezing temperature
 - Affects on groundwater upwelling & downwelling
 - Breaching flows
 - Range of available depth and velocity conditions



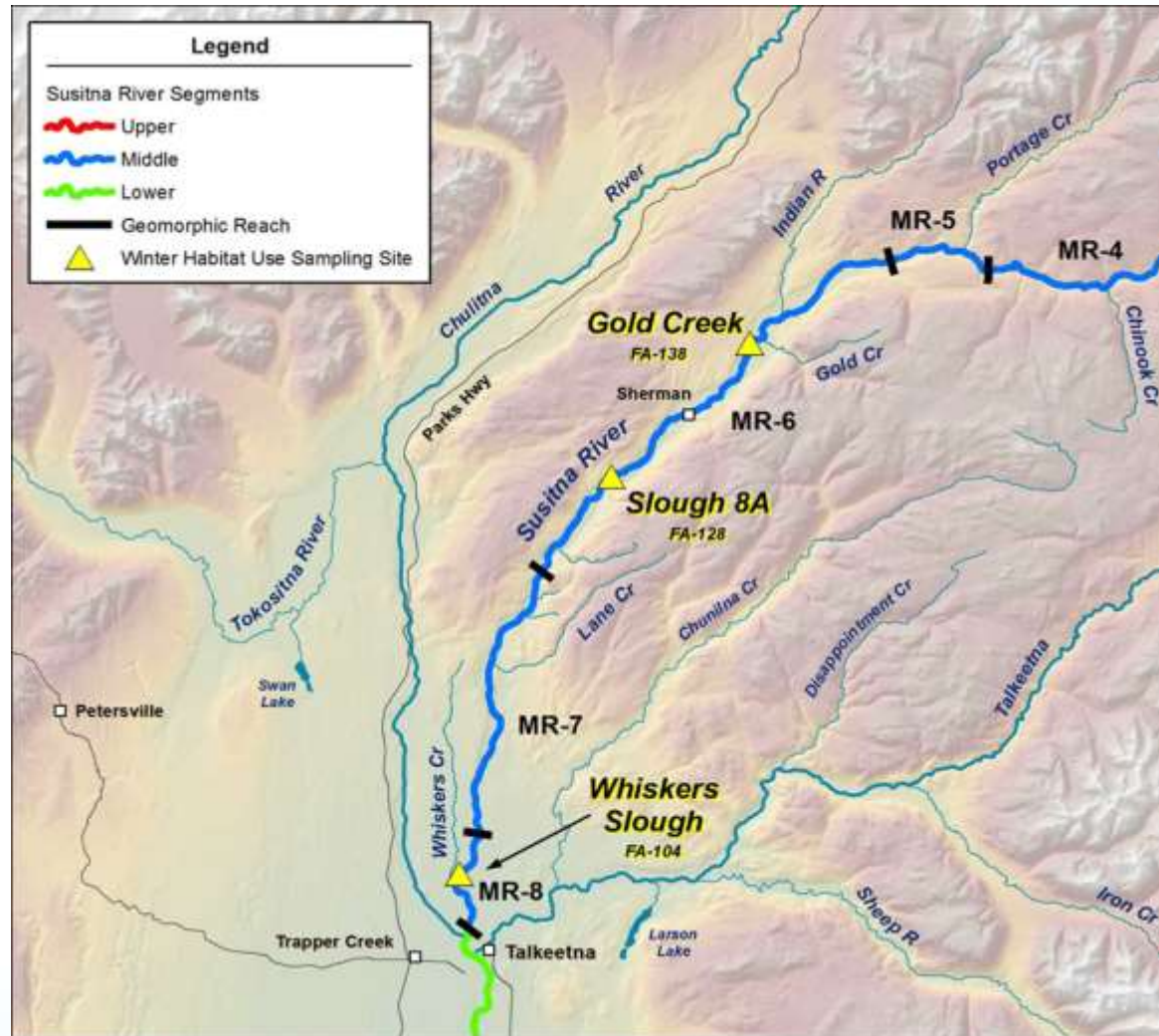
Study 8.5 IFS Winter Studies – Update

- Winter Study Objectives:
 - Compare water level changes in spawning areas in response to main channel flow
 - Monitor surface and intergravel water temperature in areas with and without groundwater upwelling
 - Monitor intergravel dissolved oxygen levels at two spawning sites during the incubation period
 - Describe the differences in juvenile and adult fish behavior during day and night conditions
 - Record site-specific microhabitat utilization in support of HSC/HSI curve development



Study 8.5 IFS Winter Studies – Update

- Winter Study Area:
 - ✓ 2012/2013
 - FA-104 (Whiskers Slough)
 - FA-128 (Slough 8A)
 - ✓ 2013/2014
 - FA-104 (Whiskers Slough)
 - FA-128 (Slough 8A)
 - FA-138 (Gold Creek)



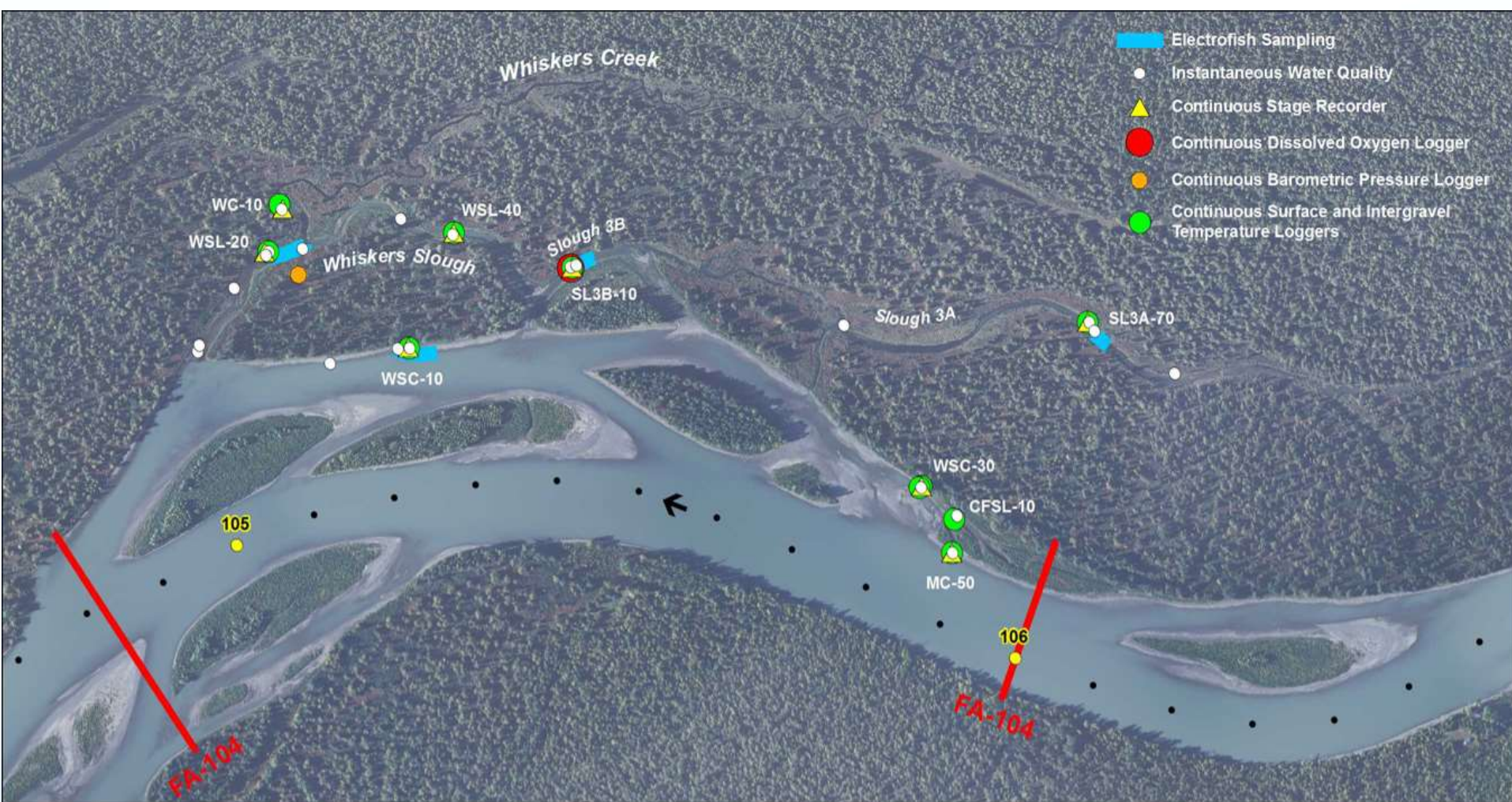
Study 8.5 IFS Winter Studies – Update

- Winter Study Methods:
 - 3 monitoring trips during each winter (Feb, Mar, Apr)
 - Water quality monitoring
 - Surface & intergravel temp.
 - Intergravel D.O.
 - Spot measurements
 - Fish observations & capture
 - Open-water and ice cover
 - Day & night surveys
 - Electrofishing & video
 - HSC measurements (depth, velocity, substrate, VHG, cover)
 - Instantaneous water quality



FA-104 (Whiskers Slough)

Winter 2013 Monitoring and Spot Measurement Sites

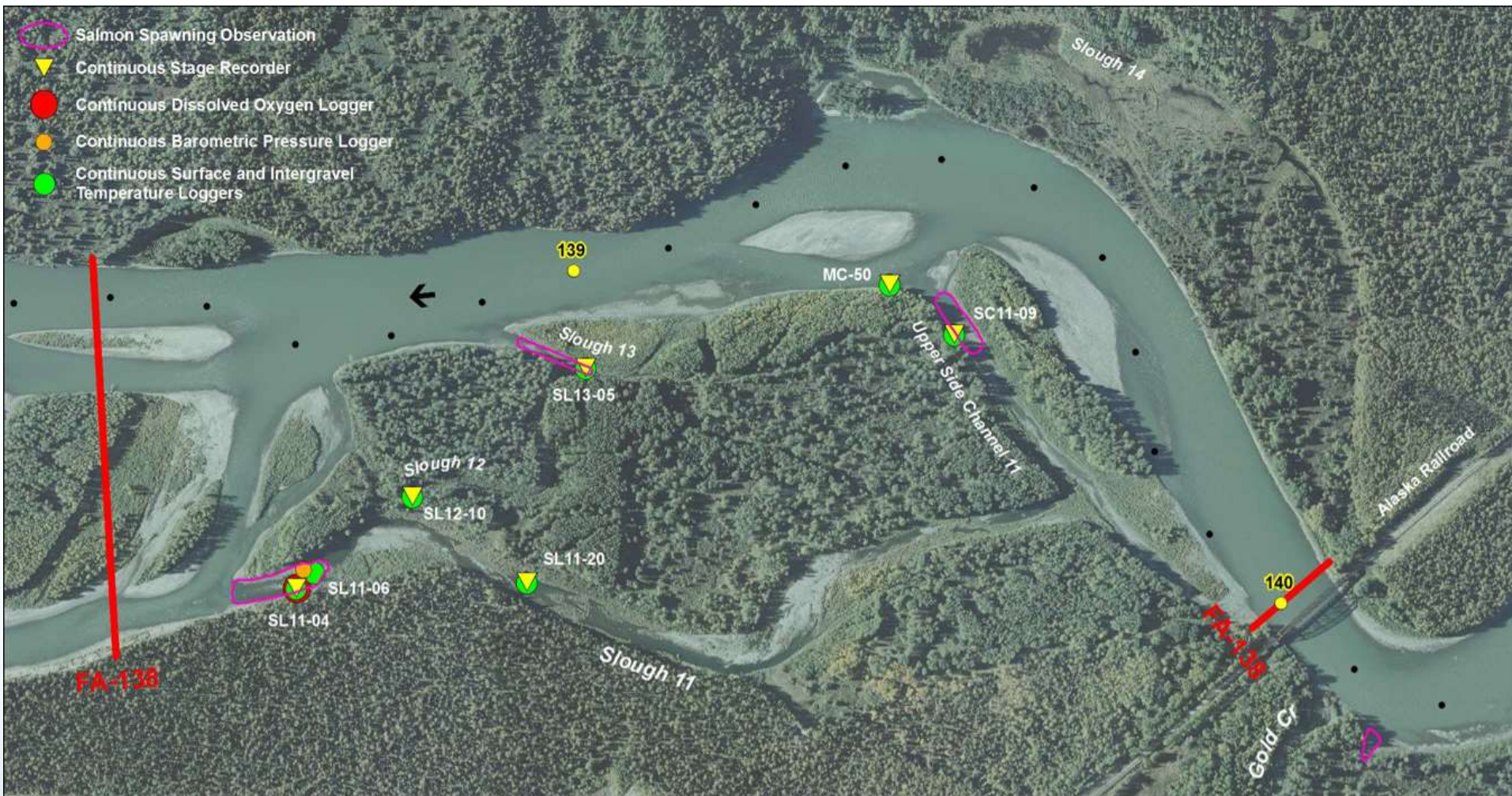


FA-128 (Slough 8A)

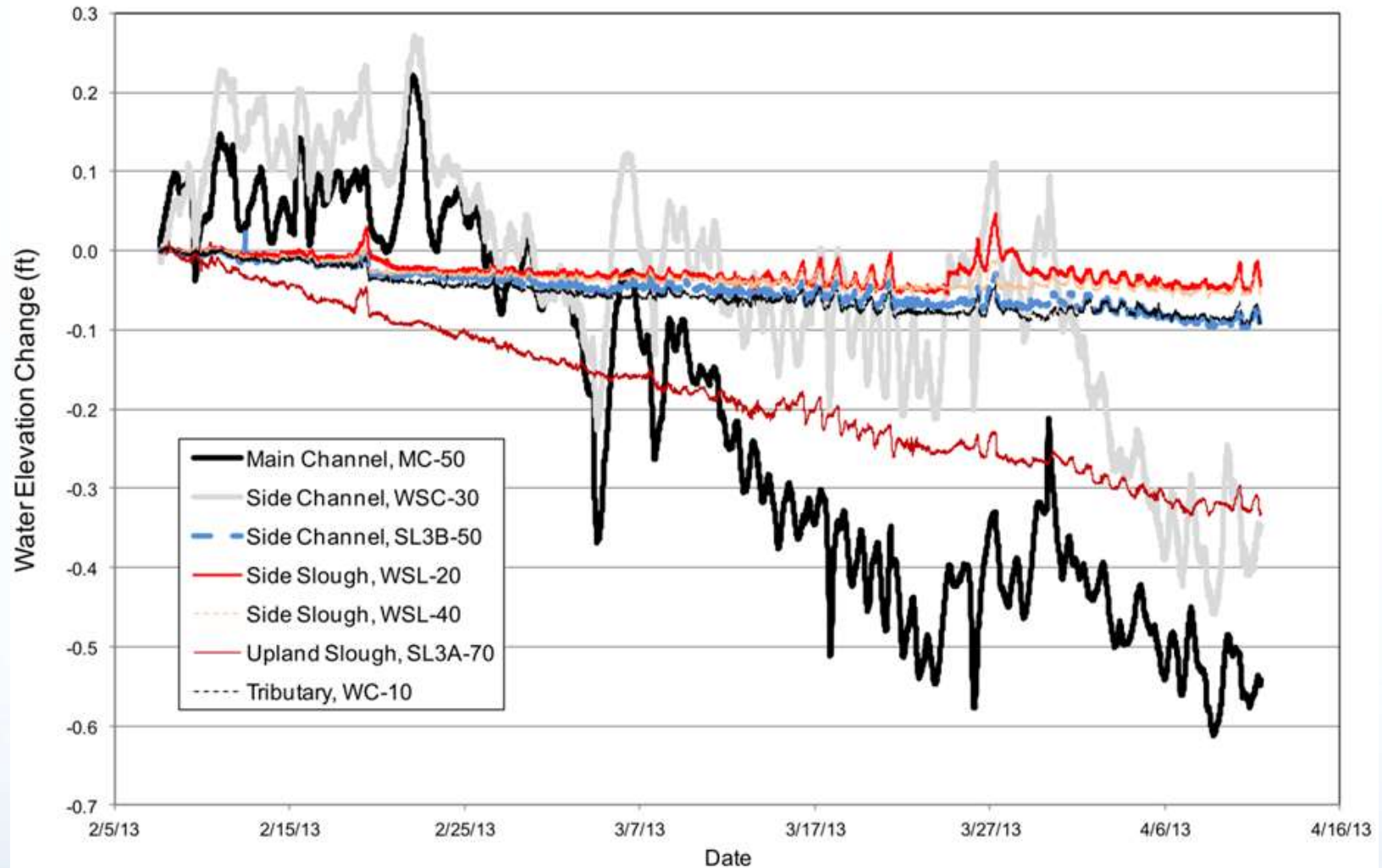
Winter 2013 Monitoring and Spot Measurement Sites



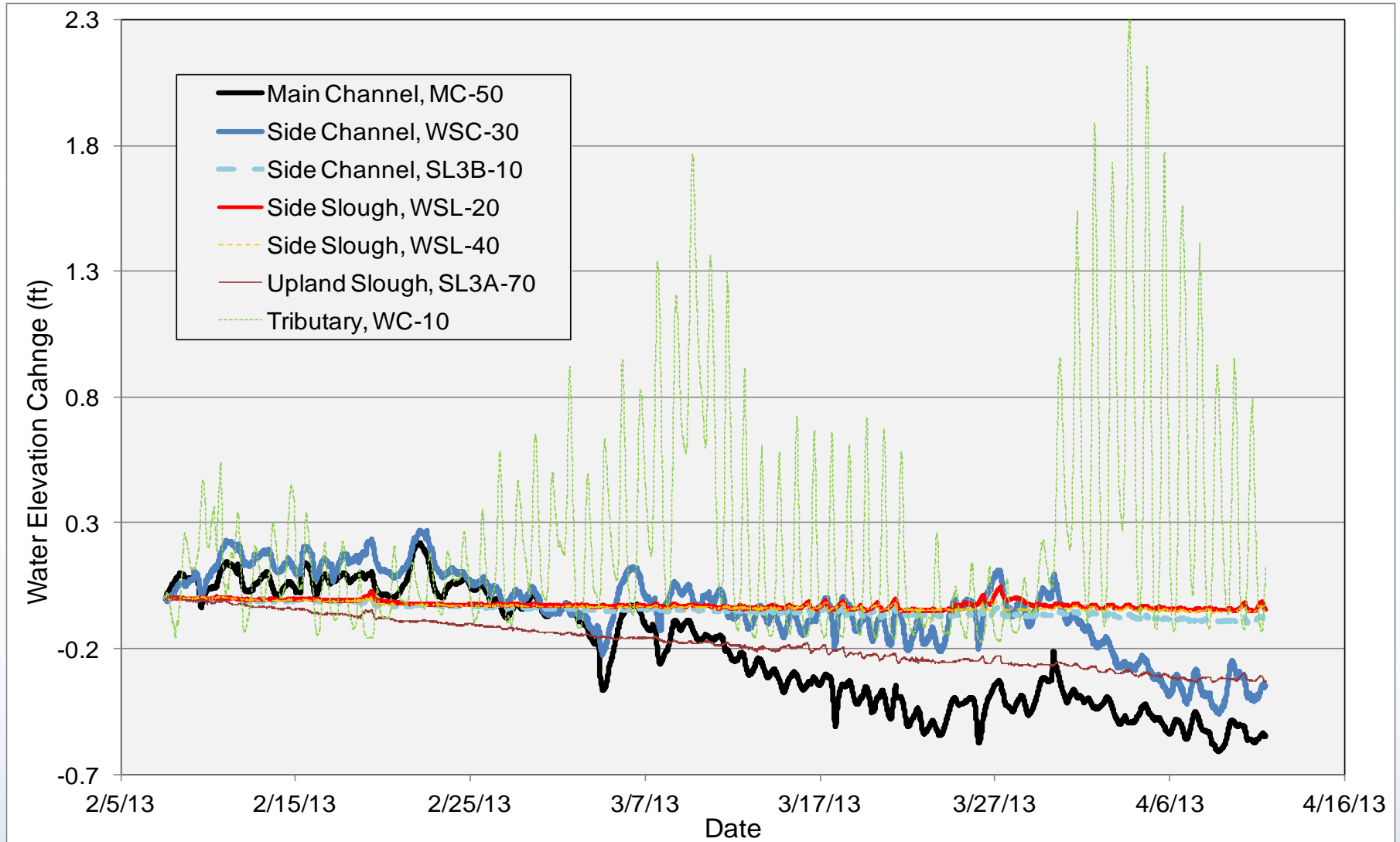
FA-138 (Gold Creek) Winter 2014 Monitoring and Spot Measurement Sites



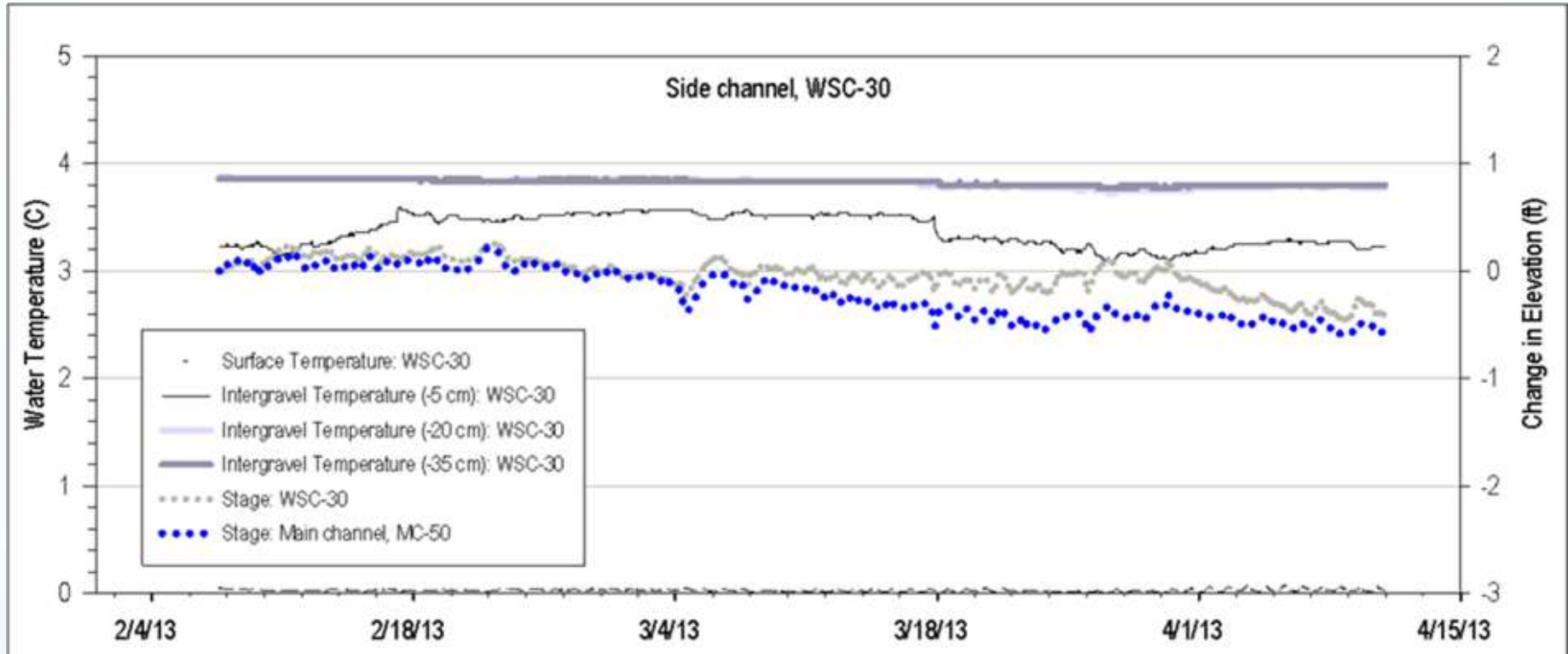
FA-104 (Whiskers Slough) Comparison of water surface elevations



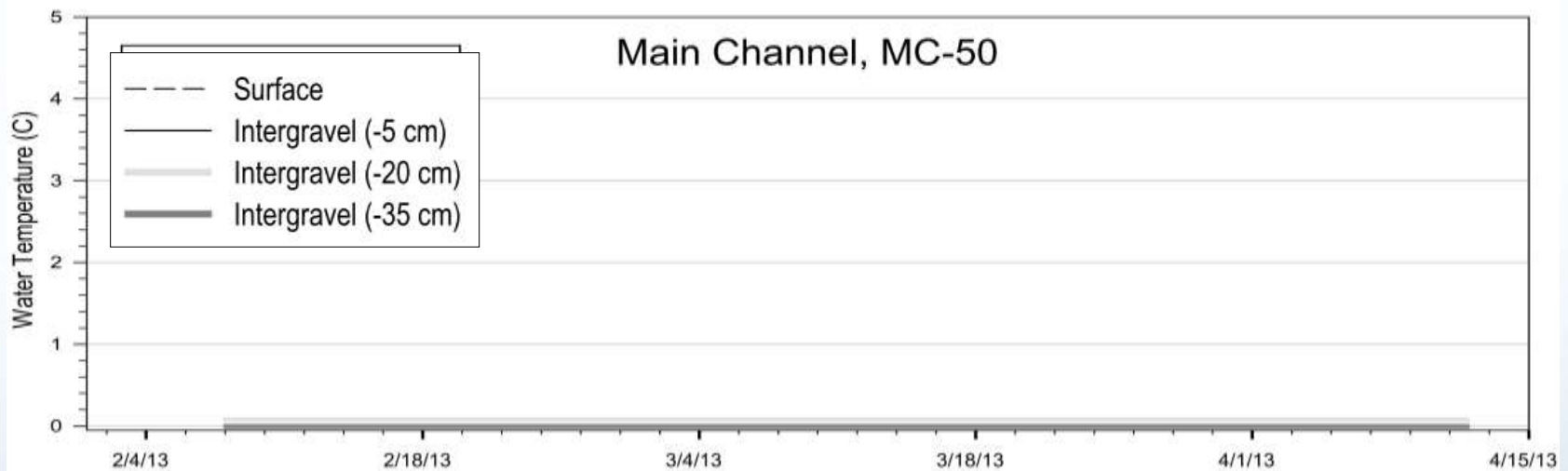
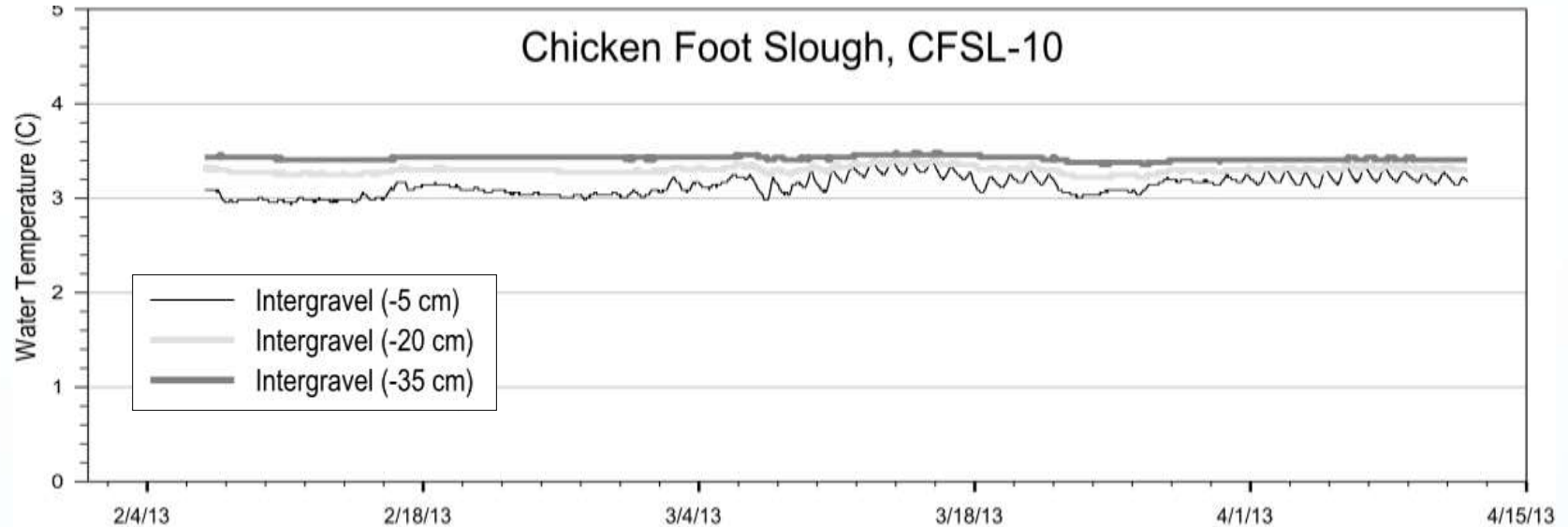
IFS Winter Studies – FA-104 (Whiskers Slough) Water Level



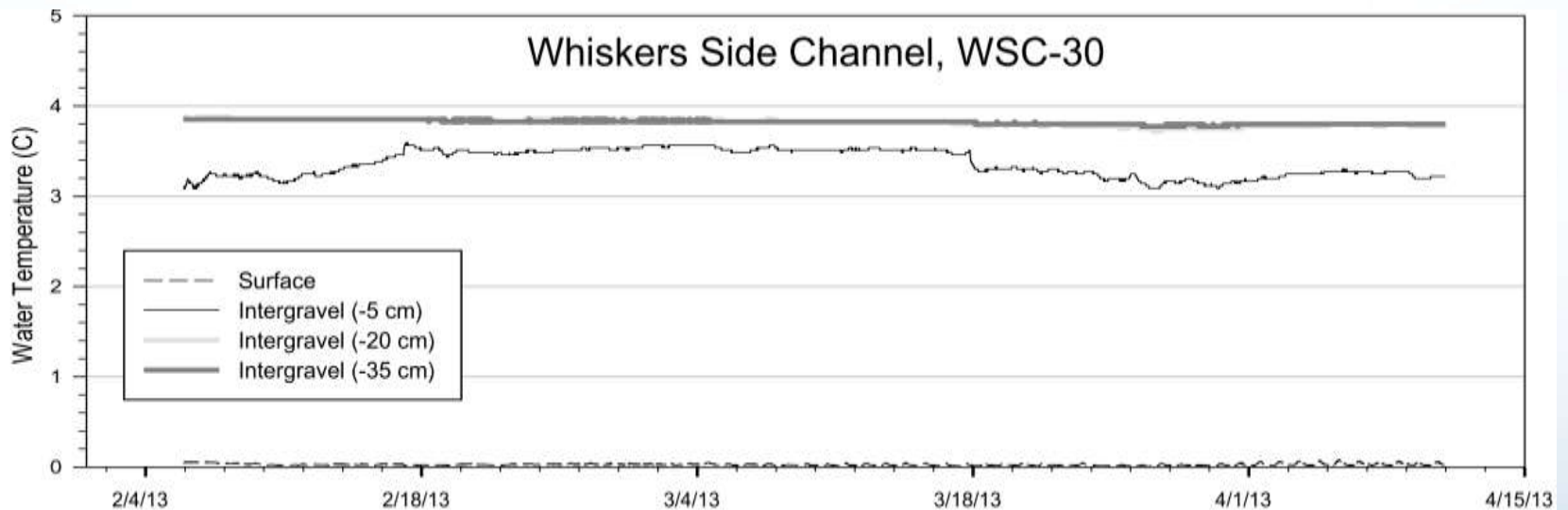
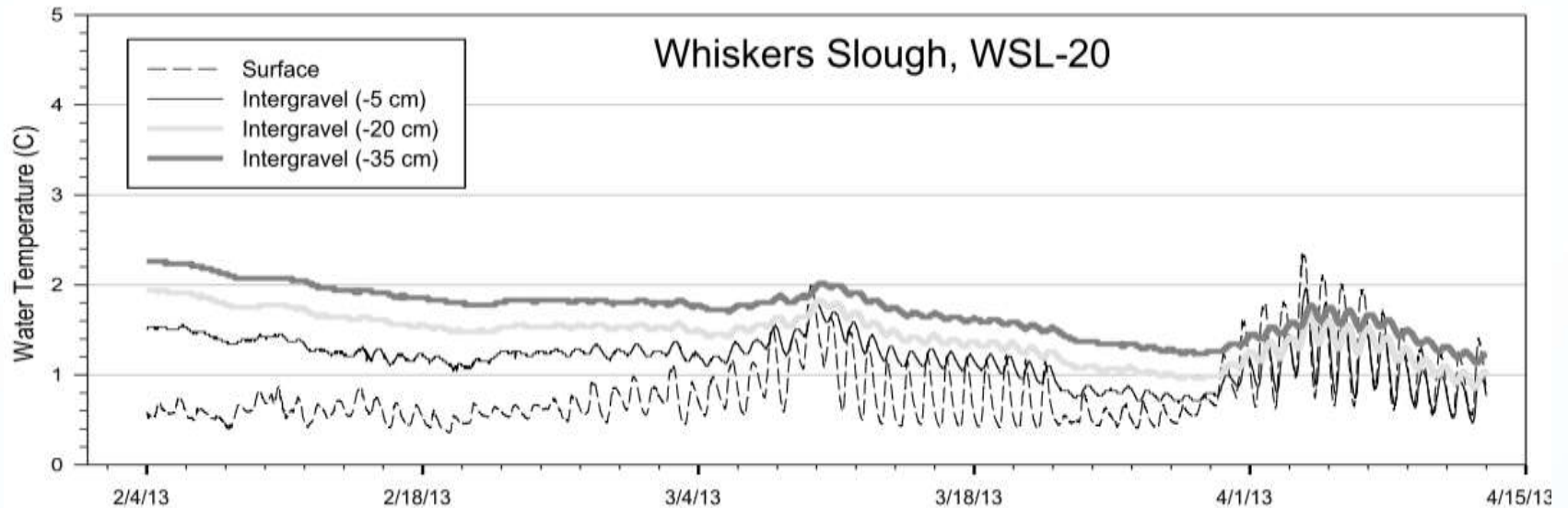
Study 8.5 IFS Winter Studies – FA-104 (Whiskers Slough) Water Level and Temperature



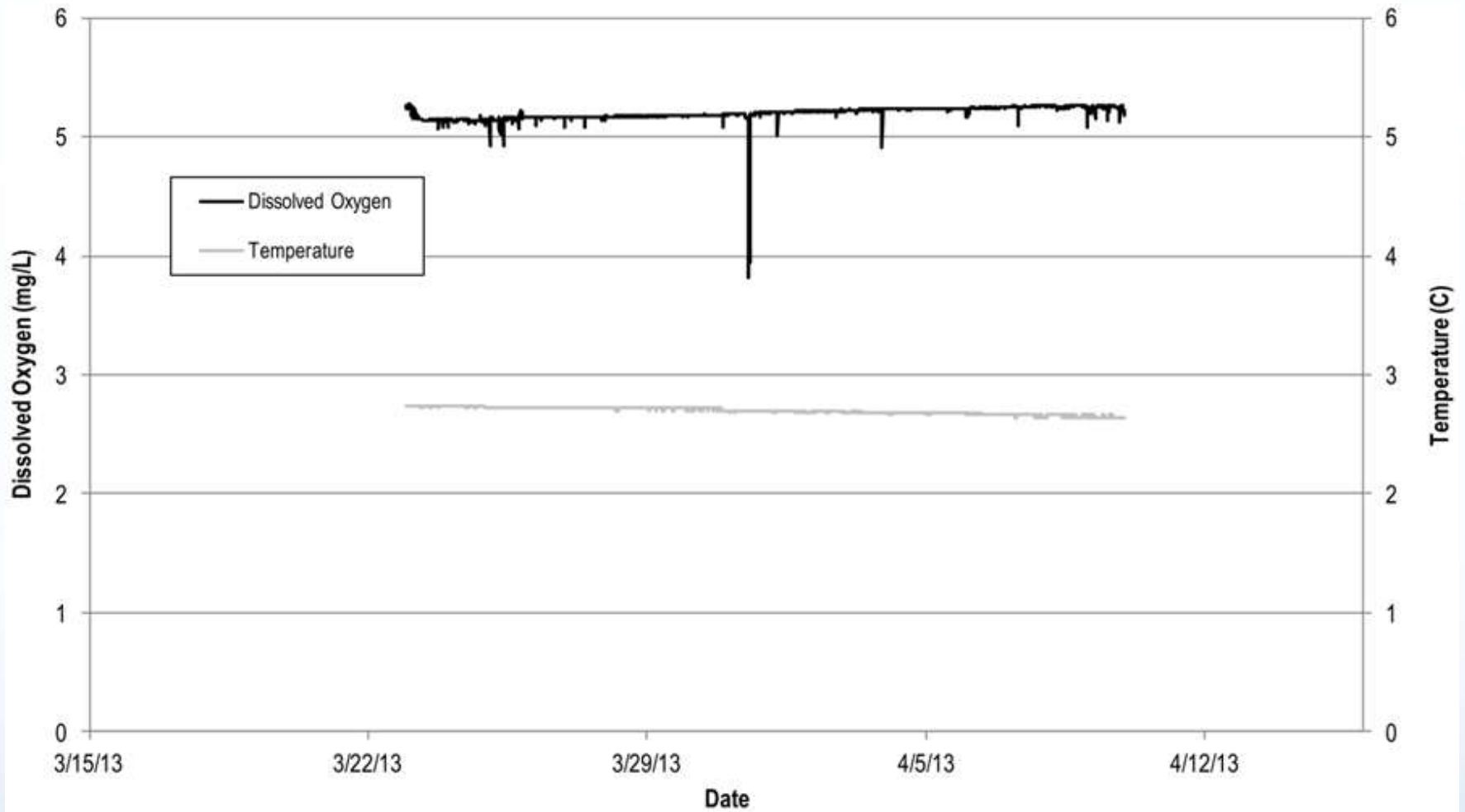
Study 8.5 IFS Winter Studies – Temperature



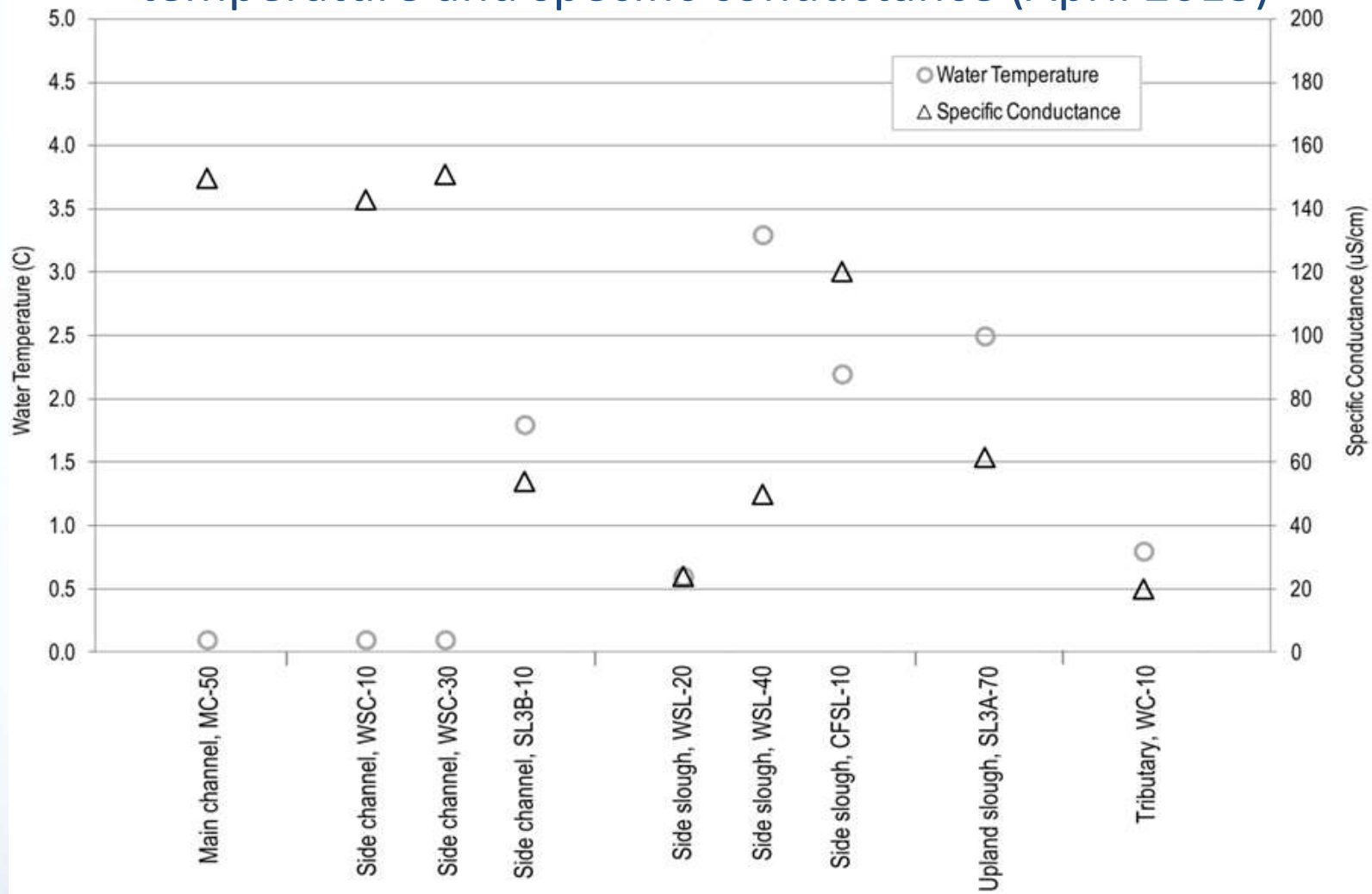
Study 8.5 IFS Winter Studies – Temperature



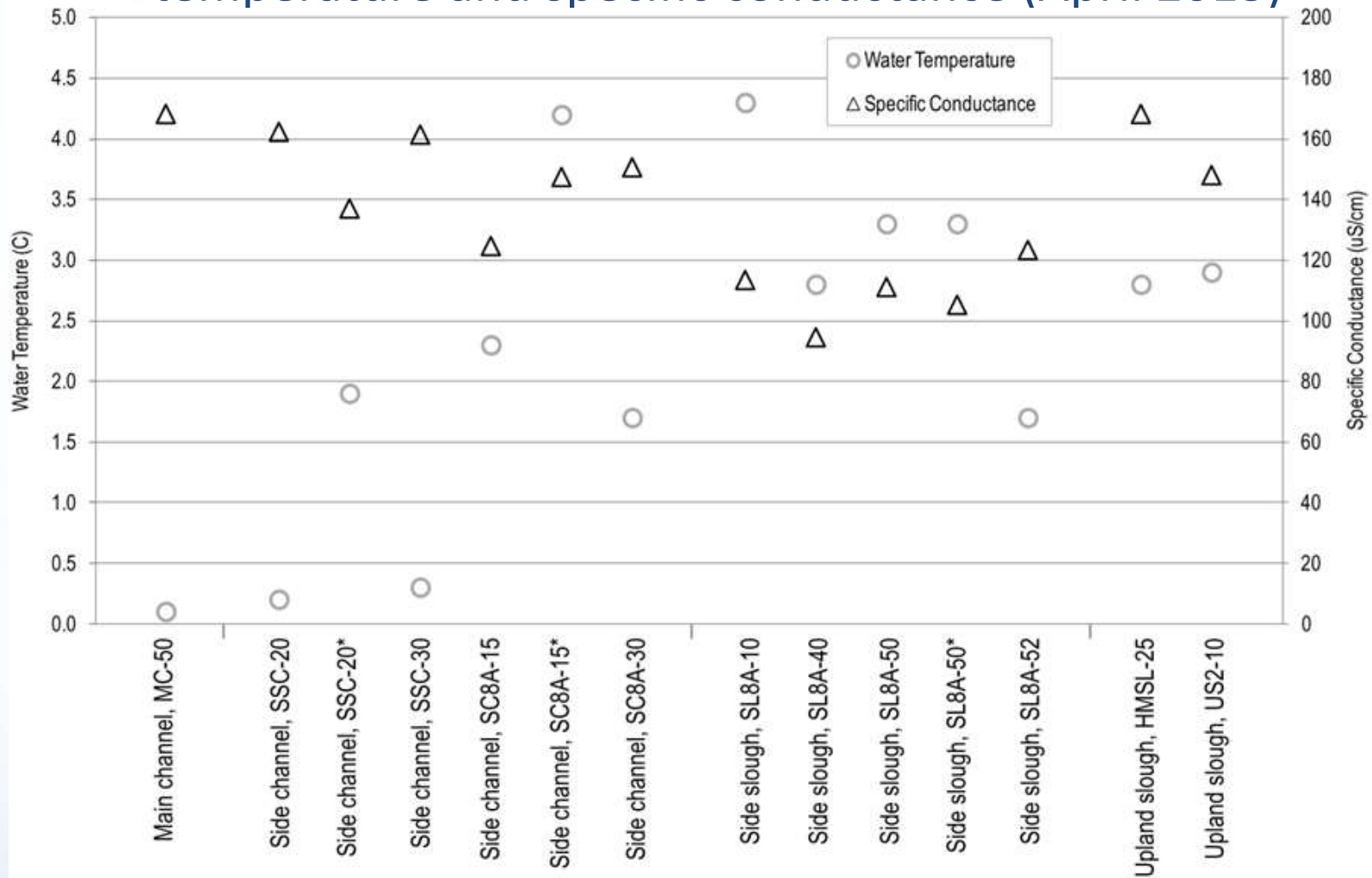
FA-128 (Slough 8A) Intergravel water temperature and dissolved oxygen (March & April 2013)



FA-104 (Whiskers Slough) Instantaneous surface water temperature and specific conductance (April 2013)



FA-128 (Slough 8A) Instantaneous surface water temperature and specific conductance (April 2013)



2013 Winter Studies Fish Capture

Site	Survey Date	Habitat Type ¹	Area Surveyed (sq. ft.)	Capture totals, by species			Total Count
				Chinook, Juvenile	Coho, Juvenile	Sculpin sp., Juvenile, adult	
104-WSL-20	24-Mar	SS	12502	0	0	8	8
104-WSC-10	24-Mar	SC	4256	0	0	0	0
104-SL3B-10	24-Mar	SC	3432	1	0	4	5
104-SL3A-71	24-Mar	US	4455	1	0	35	36
	25-Mar ²		4455	12	3	35	50
128-SL8A-10	22-Mar	SS	14850	0	0	1	1
	22-Mar ²		14850	3	0	0	3
	9-Apr		18150	2	0	8	10
128-SC8A-28	9-Apr	SC	4356	0	0	0	0
	9-Apr ²		4356	7	0	6	13
128-SSC-20	10-Apr	SC	5610	0	0	0	0
	10-Apr ²		5610	0	0	0	0
128-US2-10	22-Mar	US	240	0	0	0	0
	22-Mar ²		240	1	0	0	1

Study 8.5 IFS Winter Studies – Update

2013 Summary Findings:

- Sites with warm intergravel temp. and minimal diurnal oscillations likely represent upwelling.
- Sites with pronounced diurnal patterns in surface and intergravel temp. may represent areas of downwelling.
- Sites with strong upwelling signature (intergravel temp.), appear to be insensitive to main channel stage change.
- Strong relationship between stage change in main channel sites and side-channel sites.
- Week – no relationship between stage change in main channel and off-channel sites (unless breached).
- Increased observation/capture of fish during nighttime surveys.
- Intergravel D.O. concentrations appeared stable within spawning site



Study 8.5 IFS Winter Studies – Update

Plans for 2014 Sampling:

- Continue stage and water quality monitoring in FA-104 (Whiskers Slough), FA-128 (Slough 8A), FA-138 (Gold Creek) through salmon incubation period
- Monitor stage and water temperature in main channel and off-channel sites
- Monitor intergravel D.O. in two known salmon spawning locations
- Monitor fish activity and behavior using underwater video (day and night surveys)
- Record microhabitat use using electrofishing in open water areas and underwater video in ice cover areas
- Collect instantaneous surface water quality measurements

