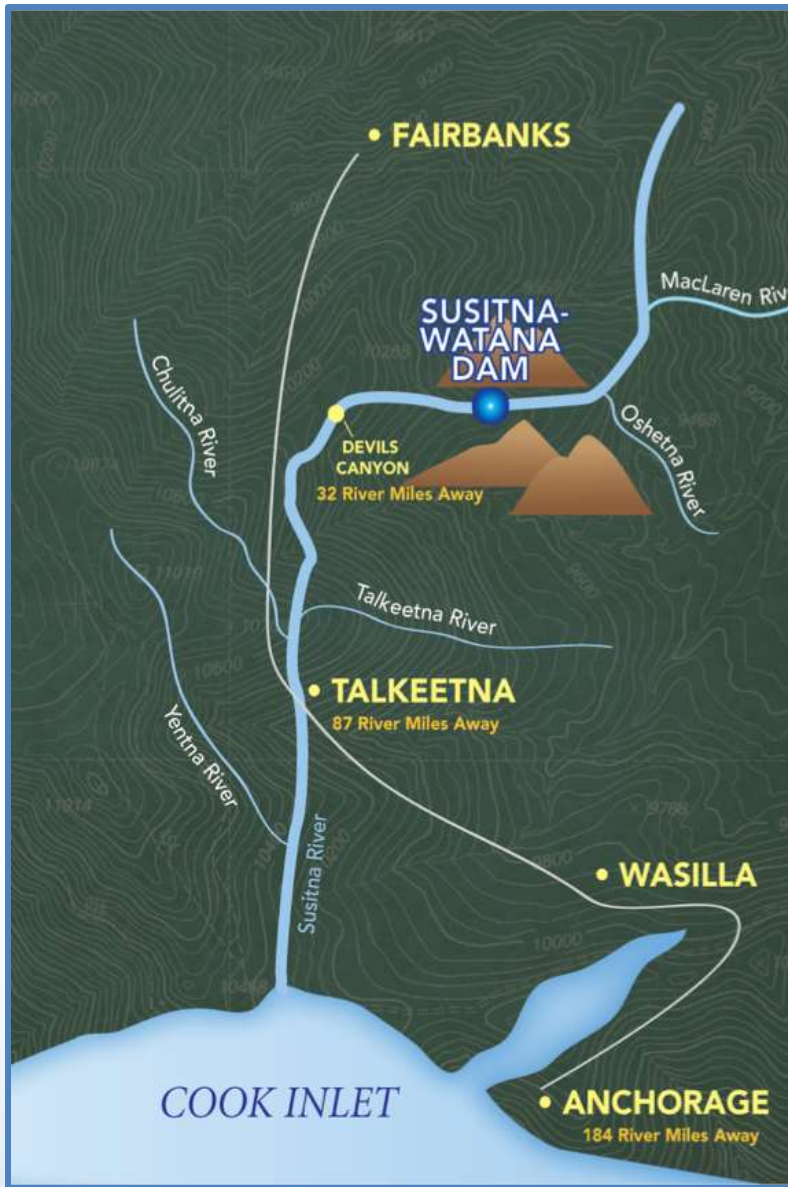


# Technical Work Group Meeting

## Groundwater Study Update on Q1/Q2 2013 And 2012/13 Winter Activities

March 27, 2013

Prepared by  
GW Scientific



# Groundwater Study (GW) Objectives

2

- 7.5.4.1 Data Synthesis
- 7.5.4.2 Geohydrologic Process-Domains
- 7.5.4.3 Watana Dam/Reservoir
- 7.5.4.4 Upwelling/Springs Broad-Scale Mapping



GW Scientific early trail establishment and safety recon at Whiskers Slough, January 22, 2013

# IFS Task3 Winter Gaging Objectives

3

- 7.5.4.5 Riparian GW/SW
- 7.5.4.6 Aquatic GW/SW
- 7.5.4.7 Water Quality in Selected Habitats
- 7.5.4.8 Winter GW/SW
- 7.5.4.9 Shallow Groundwater Users



Geovera staff conducting RTK surveying at gaging station ESS40, January 2013

# Groundwater Study FERC Status

4

- FERC January 17, 2013 Letter - Schedules Study Determination for April 1, 2013
- Schedules Change only Related to FA Evaluation



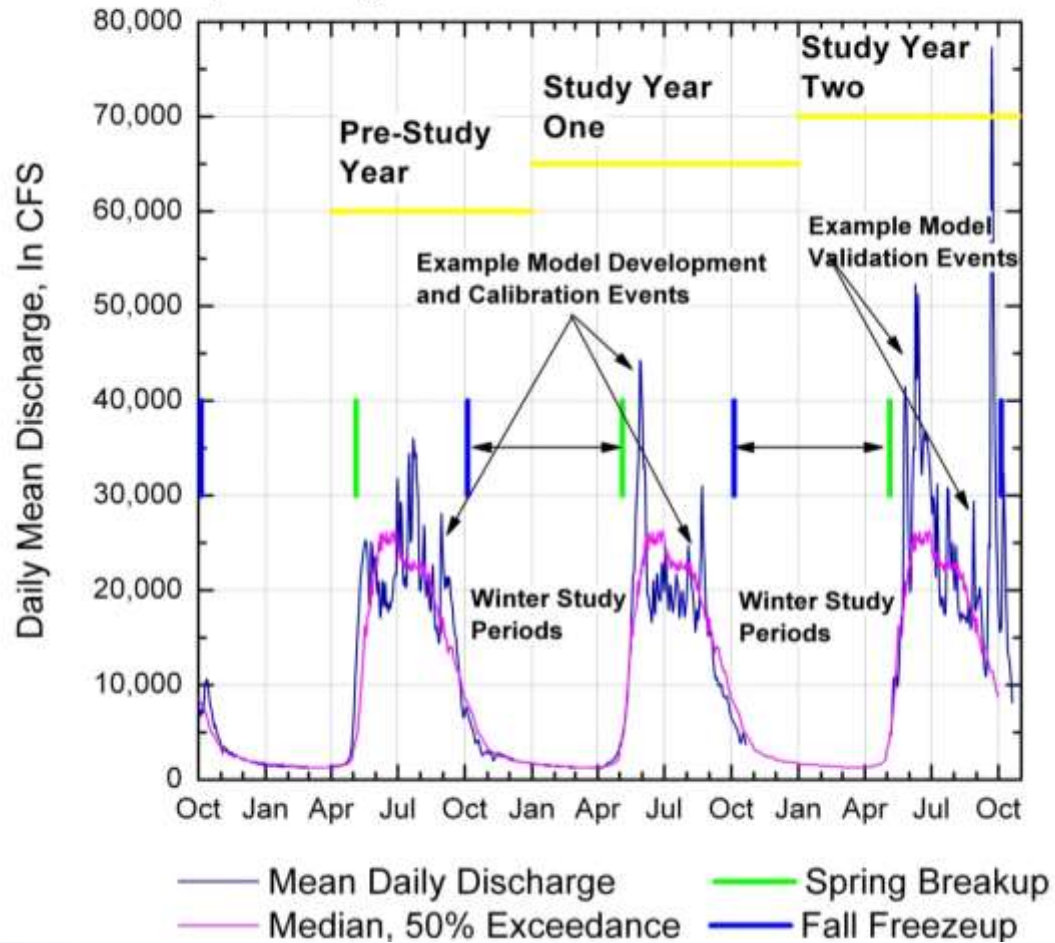
GW Scientific staff drilling ice holes for velocity measurements, upstream of gaging station ESS40, January 2013

# GW Study Schedule

Activity	2012				2013				2014				2015	
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q
7.5.4.1 Existing Data Synthesis					—	—	—	●						
7.5.4.2 Geohydrology Process-Domains					—	—	—	●			—	—	●	
7.5.4.3 Watana Dam/Reservoir						—	—	—	—	—	—	—	●	
7.5.4.4 Upwelling/Springs Broad-Scale Mapping					—	—	—	●	—	—	—	—	●	
7.5.4.5 Riparian Vegetation Dependency on SW/GW Interactions				—	—	—	—	●	—	—	—	—	—	●
7.5.4.6 Aquatic Habitat GW/SW Interactions				—	—	—	—	●	—	—	—	—	—	●
7.5.4.7 Water Quality in Selected Habitats				—	—	—	—	●	—	—	—	—	—	●
7.5.4.8 Winter GW/SW Interactions				—	—	—	●	—	—	—	—	—	●	
7.5.4.9 Shallow Groundwater Users				—	—	—	—	●	—	—	—	—	—	●
Initial Study Report / Updated Study Report									—	—	—	—	—	—

# GW Hydrologic Study Schedule

USGS Susitna River at Gold Creek Gauging Station, 15292000  
Daily Discharge for 2009 to 2012 Period with POR Median



# GW Q1,Q2 Status

7

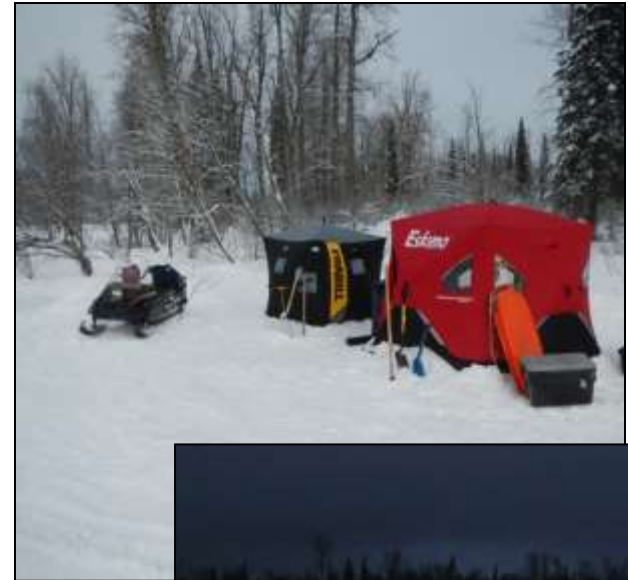
- 7.5.4.1 Data Synthesis
  - Startup, main activities in Q3, Q4
- 7.5.4.2 Geohydrologic Process-Domains
  - Startup, main activities in Q3, Q4
- 7.5.4.3 Watana Dam/Reservoir
  - Startup Q2, main activities in Q3 to Q3 2014
- 7.5.4.4 Upwelling/Springs Broad-Scale Mapping
  - Startup Q2, main activities in Q3 to Q3 2014



Open shallow lead in side channel near Whiskers Slough, January 22, 2013

# GW Q1,Q2 Status

- 7.5.4.5 Riparian GW/SW
  - Startup & planning in Q1
  - Field Implementation in Q2, Q3
  - Select FAs targeting “Leaf-Out”
- 7.5.4.6 Aquatic GW/SW
  - Startup & Planning in Q1
  - Field Implementation in Q2, Q3
  - Select FA targeting “Breakup”



Whiskers Slough safety warm-up tents, logistics camp, evening return to Talkeetna, February 2, 2013



# GW Q1,Q2 Status

9

- 7.5.4.7 Water Quality in Selected Habitats
  - Startup & Planning in Q1
  - Primary activities starting Q3
- 7.5.4.8 Winter GW/SW
  - Startup and Planning Q1
  - Primary activities starting Q1
- 7.5.4.9 Shallow Groundwater Users
  - Startup and planning Q1, minor activities in Q2, main activities in Q3, Q4



R2 Resources IFS field team installing sensors and evaluating aquatic habitat in Whiskers Creek, February 3, 2013

# GW RSP 7.5.4.1 - Data Synthesis Highlights

10

- Planning discussions with ARLIS, Study Team
- Identification of Early References, Areas and Information to Pursue

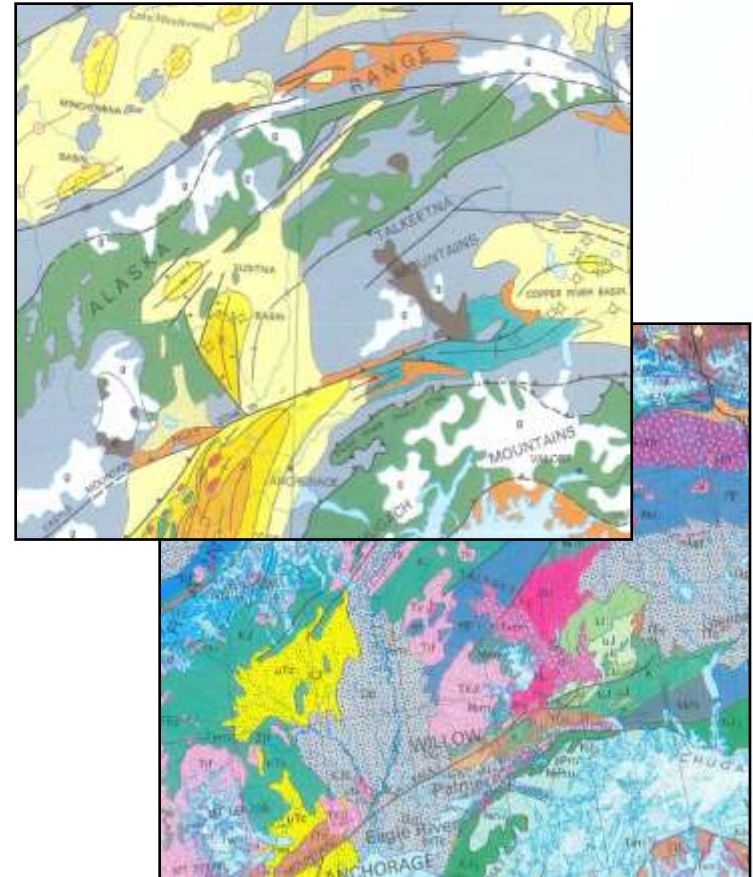


Winter Studies team at Whiskers Slough logistics camp, evaluating snow bridge safety on access trail, February 5-6, 2013

# GW RSP 7.5.4.2 - Geohydrologic Process-Domains Highlights

11

- Early Study Team Planning
- Primary Example is Tanana Basin – Anderson, 1970
- Collect information in Q2
- Start analysis in Q3



Geologic map examples, (Kirschner 1994, and Beikman 1994)

# GW RSP 7.5.4.3 - Watana Dam/Reservoir Highlights

12

- Activities and Early Planning Begin 2013 Q2
- Identification of 2012/13 End-of-Winter Conditions, Q2
- Main Activities and Interaction with Engineering Studies Begin Q3



Groundwater seeps at proposed Watana Dam site, early winter icing conditions, October 20, 2012

# GW RSP 7.5.4.4 - Upwelling/Springs Broad-Scale Mapping Highlights

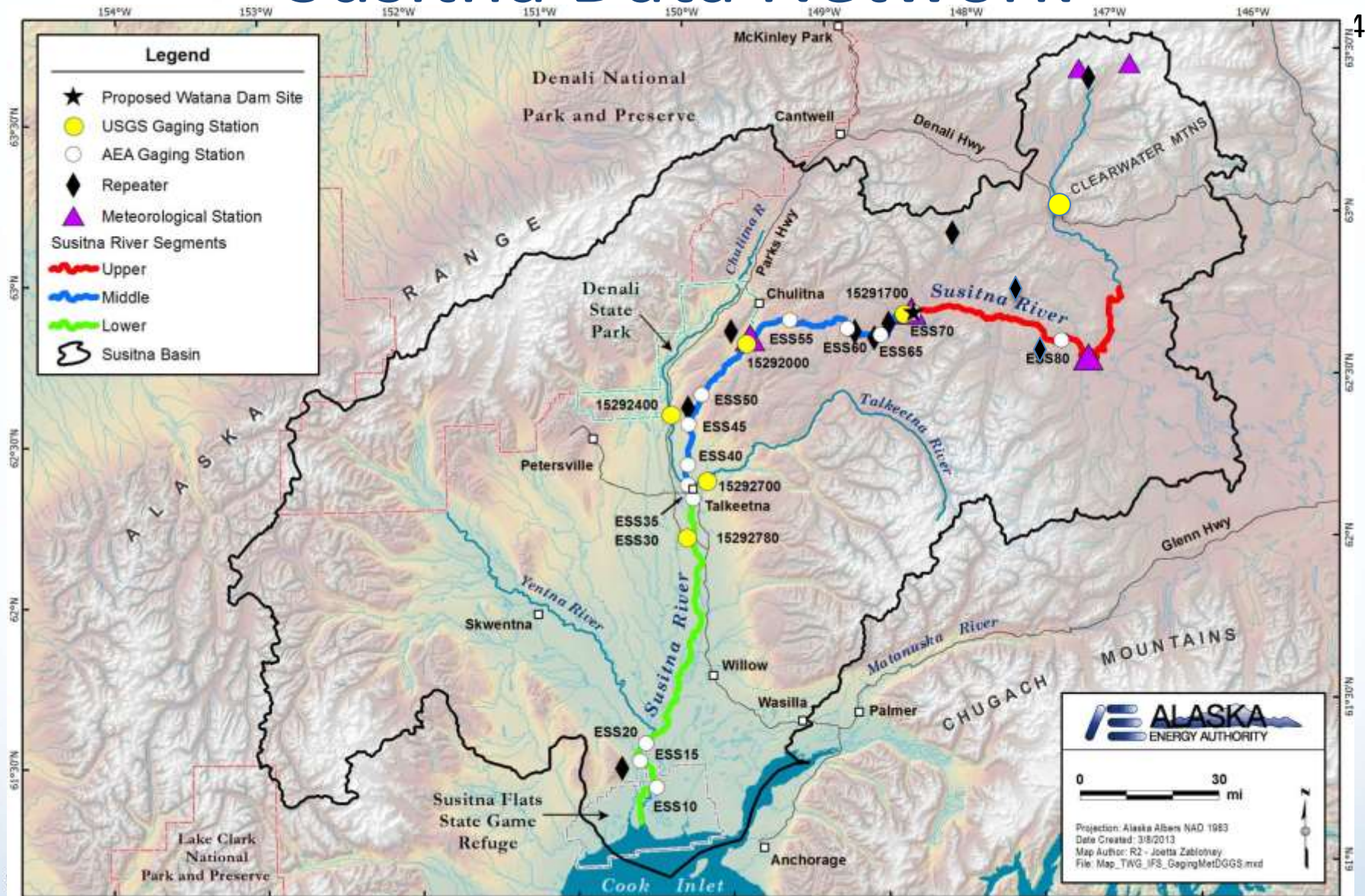
13

- Startup and Planning Q2
- Identification of 2012/13 End-of-Winter Conditions, Q2
- Coordination with Ice Processes, IFS – Winter Gaging Program
- Winter Studies

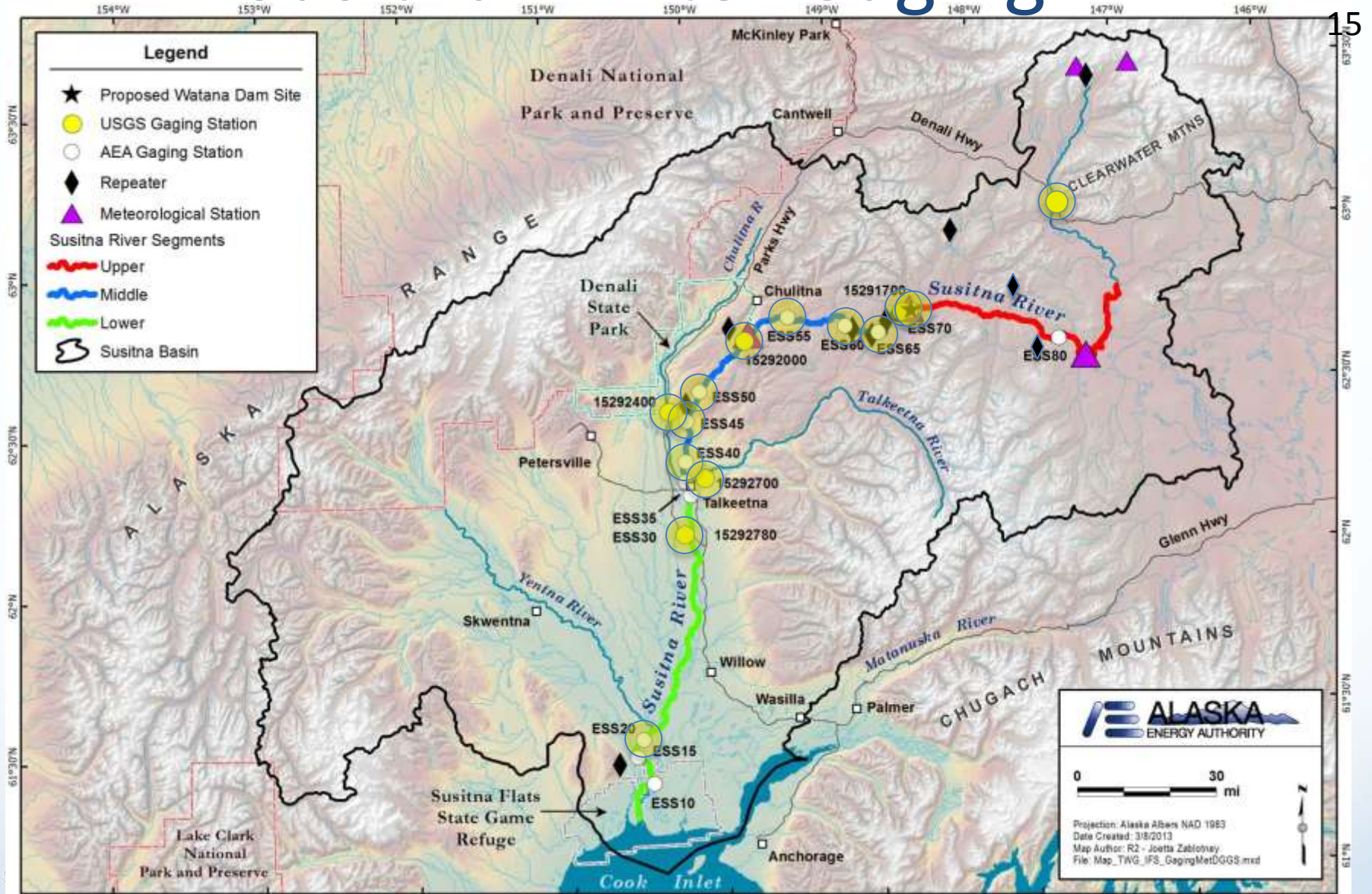


Whiskers Slough area, Upland Springs, GW Scientific, Geovera GW/SW team setting survey control, February 6, 2013

# Susitna Data Network



# Susitna Winter Gaging =



# IFS Task3 Winter Gaging Q1,Q2 - GW 7.5.4.4 Coordination

16

- 2 Measurement Periods,  
Late January, Late  
March/Early April
- January – Cold Conditions
- March/April – Main Focus
  - Ice Processes – March 4-12
  - USGS – March 25-29
  - IFS Task3– March 25 – April 5



Geovera staff conducting RTK surveying at  
ESS40, GW Scientific and Brailey  
Hydrologic ice drilling, January 2013



# IFS Task3 Winter Gaging Objectives

17

- Ice Conditions for Ice Processes
- Under Ice Conditions for Discharge
- Winter Hydrology Data
- Synoptic Discharge Measurements for Groundwater Study



Susitna River, M. Wood, Spring 2007

# IFS Task3 Winter Gaging Objectives

18

- Coordinated Measurements with USGS
- Coordinated Measurements with Ice Processes
- Applications for Large-Scale Upwelling Delineations



Susitna River, M. Wood, Early Fall ice jam and cover conditions, 2007

# IFS Task3 Winter Gaging Q1 Activities

19



Measurement  
Location

Station

Open  
Lead

Ice Jam  
Ridges

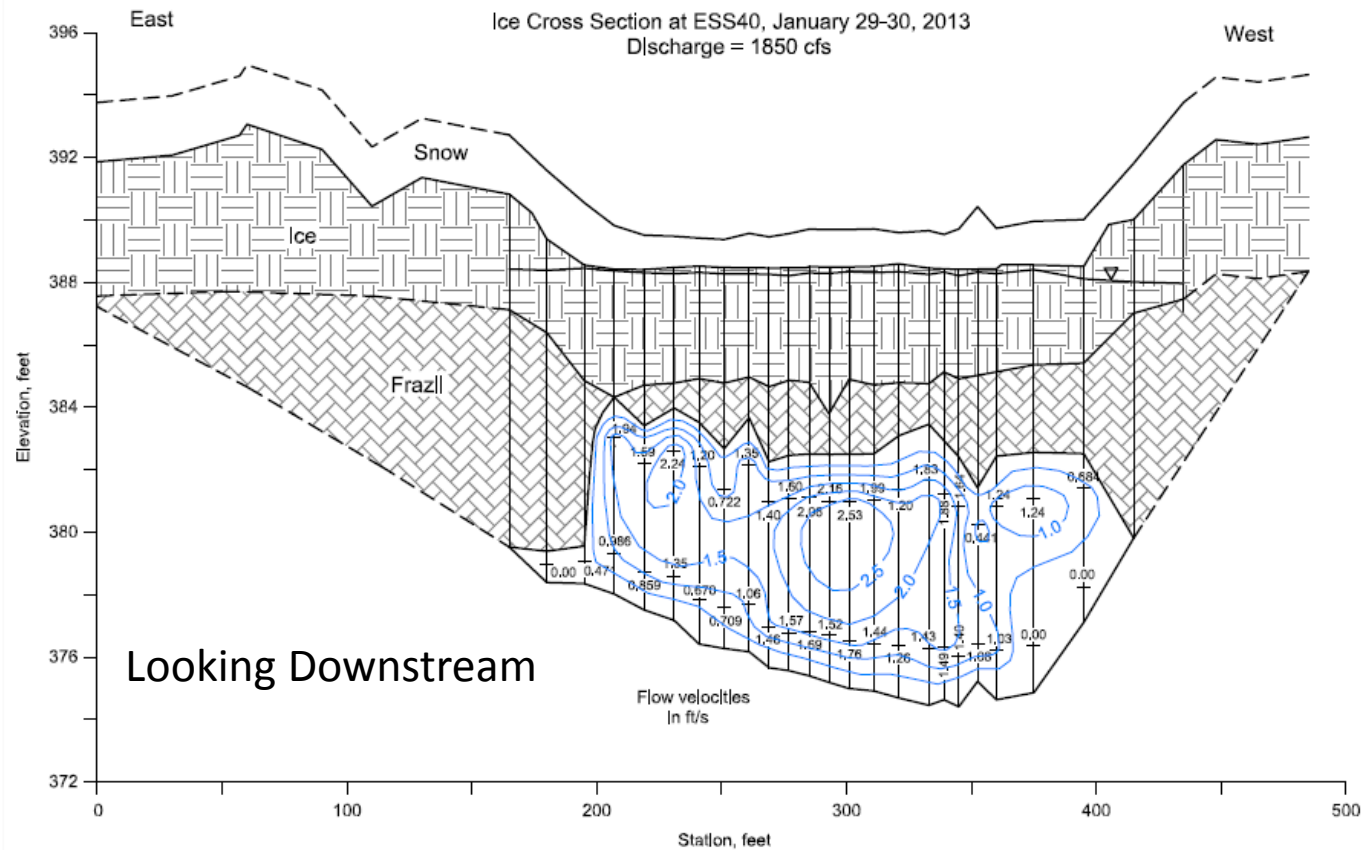
# IFS Task3 Winter Gaging Q1 Activities



Discharge  
Measurement  
And Cross-  
Section  
Location

Susitna River, Looking Upstream

# IFS Task3 Winter Gaging Q1 Activities



Ice Measurement Cross-Section, Dave Brailey, January 2013

# GW RSP 7.5.4.5 – Riparian GW/SW Highlights

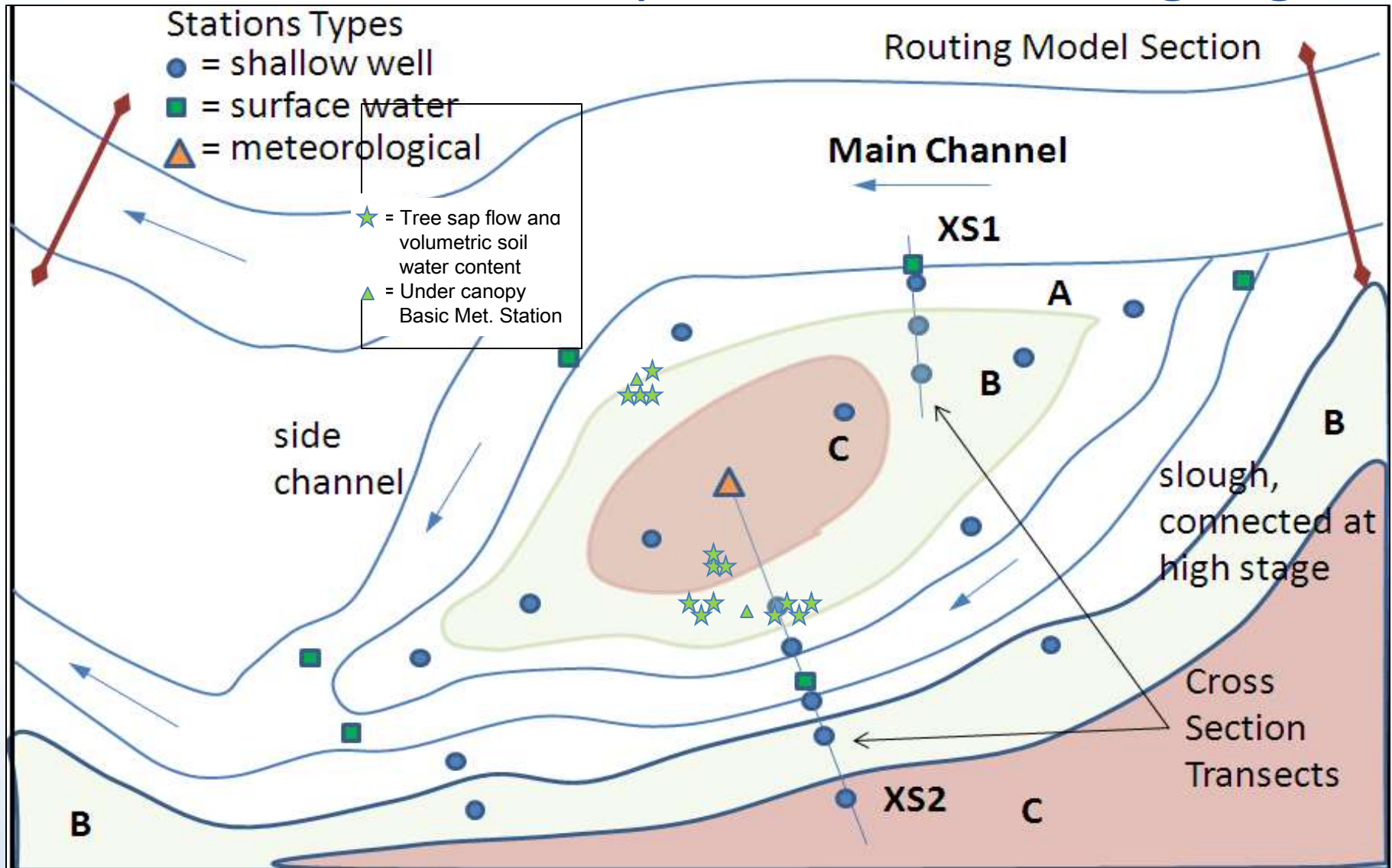
22

- Q1 – Team Planning
- Q2 – Early Implementation of Key Data Collection – Capture “Leaf Out”
- Q3 – Shallow GW Wells, Subsurface Data (after seasonal frost thawed)

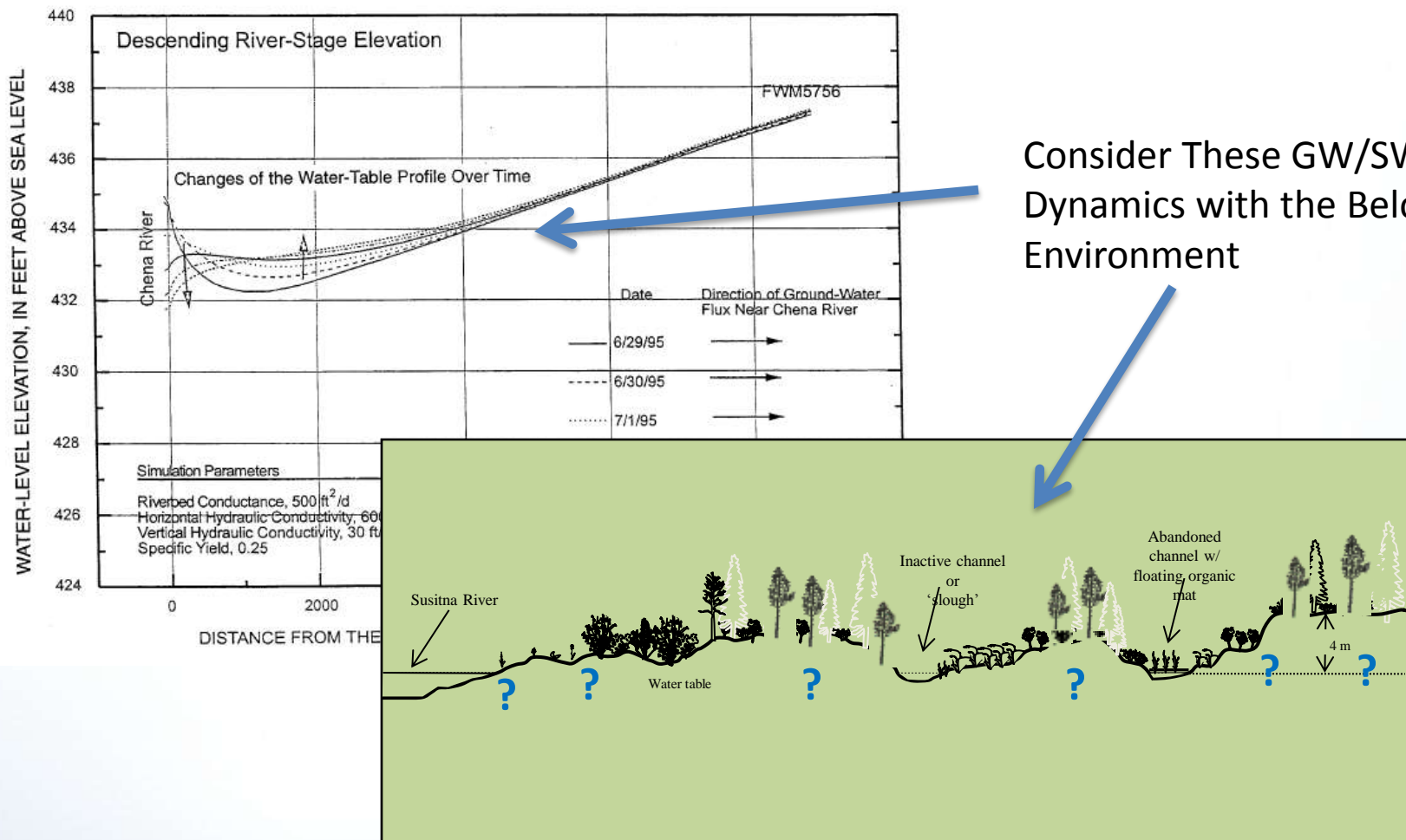


Whiskers Slough FA, GW Scientific, Geovera GW/SW team, winter field operations, February 6, 2013

# GW RSP 7.5.4.5 – Riparian GW/SW Highlights



# GW RSP 7.5.4.5 – Riparian GW/SW Highlights





# GW RSP 7.5.4.6 – Aquatic GW/SW Highlights

25

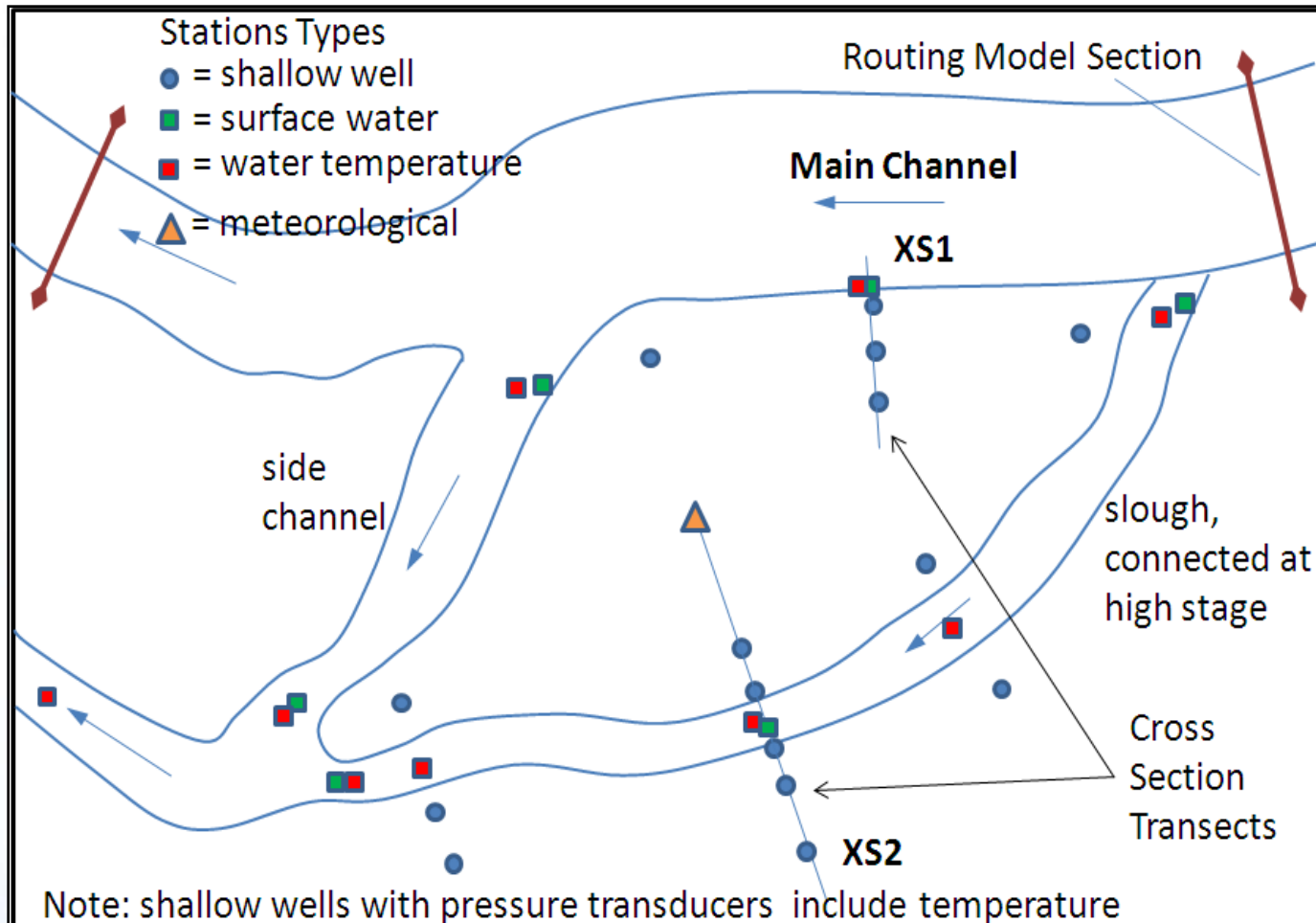
- Q1 – Team Planning
- Q2 – Key End of 2012/13 Winter, Break-Up Observations at FAs
- Q3 – Begin Main Installation of Hydrology Stations



Whiskers Slough area, Susitna River side channel, GW Scientific GW/SW team sampling water quality, February 6, 2013

# GW RSP 7.5.4.6 – Aquatic GW/SW Highlights

26



# GW RSP 7.5.4.7 – Water Quality in Selected Habitats Highlights

27

- Q1 – Team Planning, Early WQ Sampling in Winter Studies FAs
- Q2 – Key End of 2012/13 Winter, Break-Up Observations at FAs
- Q3 – Begin Main Installation of WQ Sensors



Whiskers Creek, R2 Fish Team, and GW Scientific GW/SW Team, February 6, 2013

# GW RSP 7.5.4.8 – Winter GW/SW Highlights

28

- Q1 – Team Planning, Winter Studies in Whiskers Slough, Slough 8A FAs
- Q2 – Continue Winter Studies, 2012/13 End-of-Winter Recon Observations
- Q4 – Begin Main Winter 2013/14 Observations



Whiskers Creek, R2 Fish Team, and GW Scientific GW/SW Team, February 6, 2013

# GW RSP 7.5.4.9 – Shallow Groundwater Users Highlights

29

- Q1 – Team Planning, Early Measurements Start w/Winter Studies
- Q2 – Begin Station Installation at Selected Wells, Identification of Additional Wells
- Q3 – Main Installation of Additional Well Installations



R2 IFS field staff installing sensors in Whiskers Slough, low-flow conditions, February 6, 2013

# Groundwater Study

30

- Thank You!
- Questions?
- More information at:  
[www.susitna-watanahydro.org](http://www.susitna-watanahydro.org)



GW Scientific, Geovera establishing survey control for water level station and R2 IFS site , February 12, 2013