John Day River Basin Irrigation Efficiency

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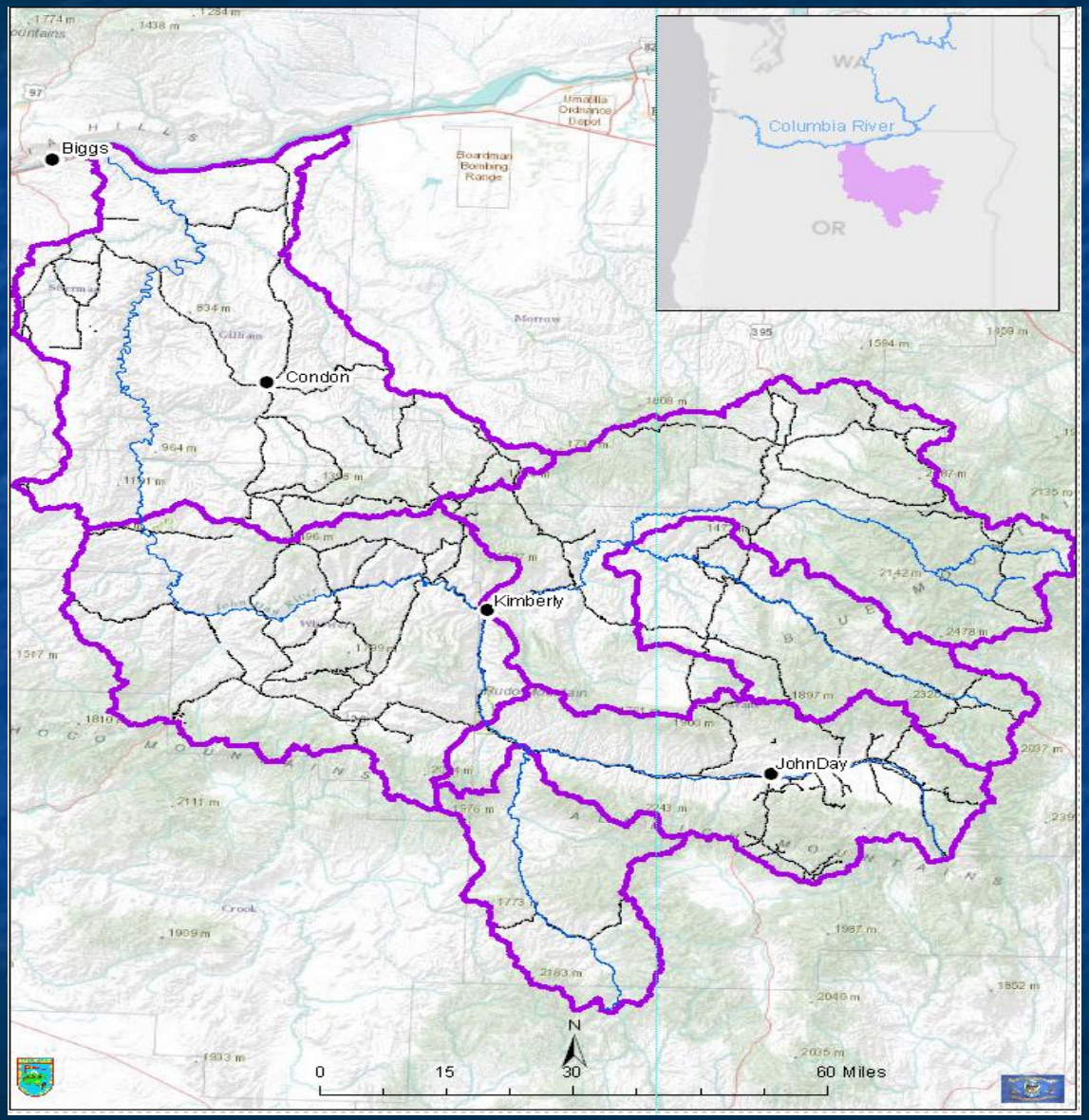
Outline

- John Day Basin irrigation background
- Methods and decisions
- Preliminary results and 2012 field season

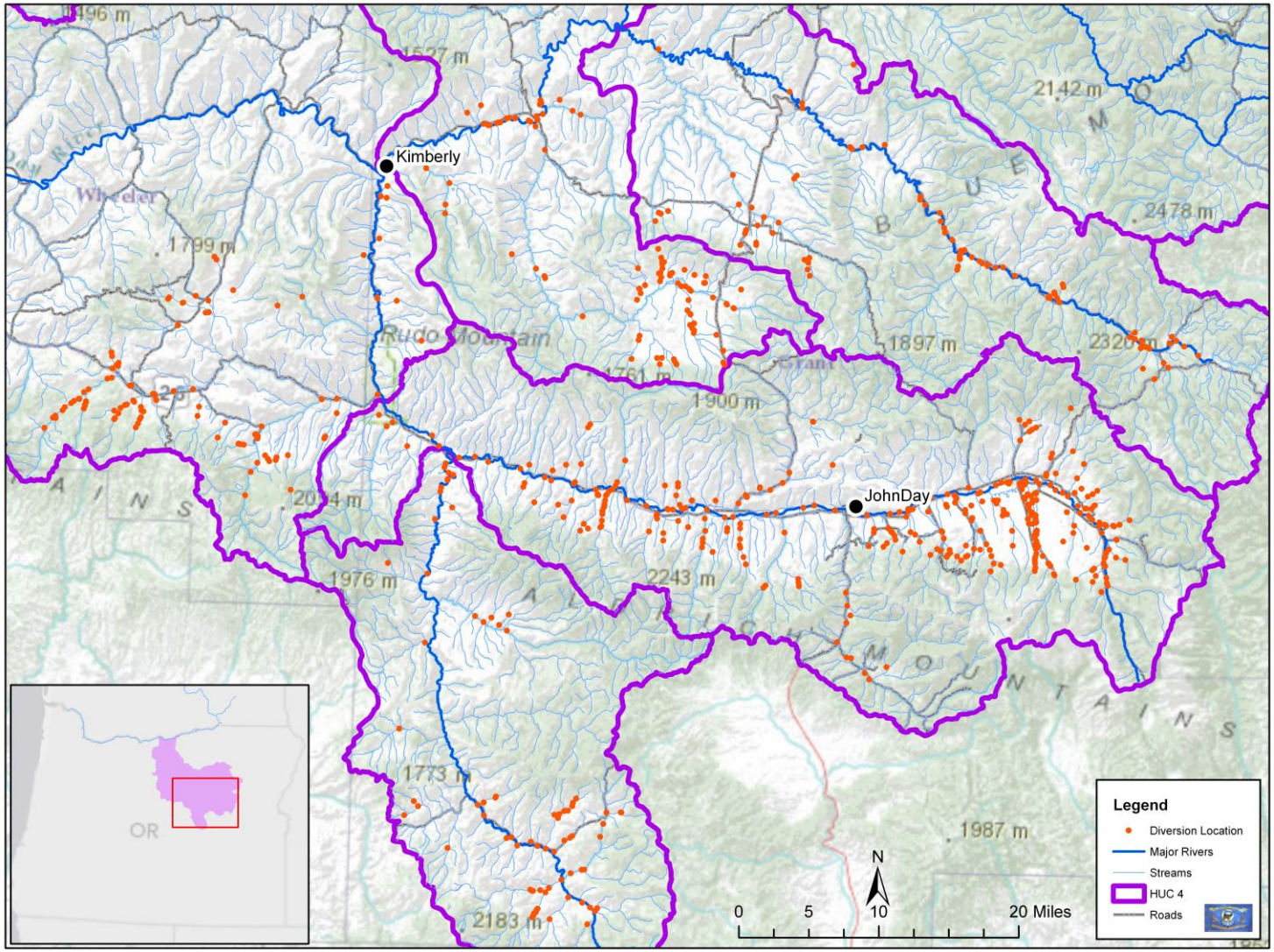
John Day River Basin



John Day River Basin

- Climate ranges from sub-humid to semi-arid
- Snowmelt driven system
  - Peak discharge - March through June
  - Low flows - August through October

Irrigation


Kimberly
JohnDay
1799 m
1897 m
1900 m
2478 m
2143 m
1976 m
2243 m
1773 m
1987 m
2183 m
OR
N
0 5 10 20 Miles
Legend
Diversion Location
Major Rivers
Streams
HUC 4
Roads

- Water availability and consumptive use at 50% exceedance levels for the upper John Day River above the mouth of the South Fork

Month	Natural Stream Flow (cfs)	Consumptive Use	Consumptive use for Irrigation	Instream Requirement	Net Water Availability
JAN	229.0	4.8	0.0	80	144.0
FEB	346.0	5.1	0.0	118	223.0
MAR	493.0	5.6	0.0	118	369.0
APR	705.0	31.2	25.0	118	556.0
MAY	727.0	63.1	56.9	118	546.0
JUN	512.0	83.7	76.2	80	348.0
JUL	195.0	119.0	113.0	50	25.8
AUG	98.8	93.4	87.1	30	-24.6
SEP	77.7	63.3	57.0	30	-15.6
OCT	144.0	26.1	21.6	50	67.9
NOV	163.0	4.6	0.0	80	78.4
DEC	207.0	4.7	0.0	80	122.0

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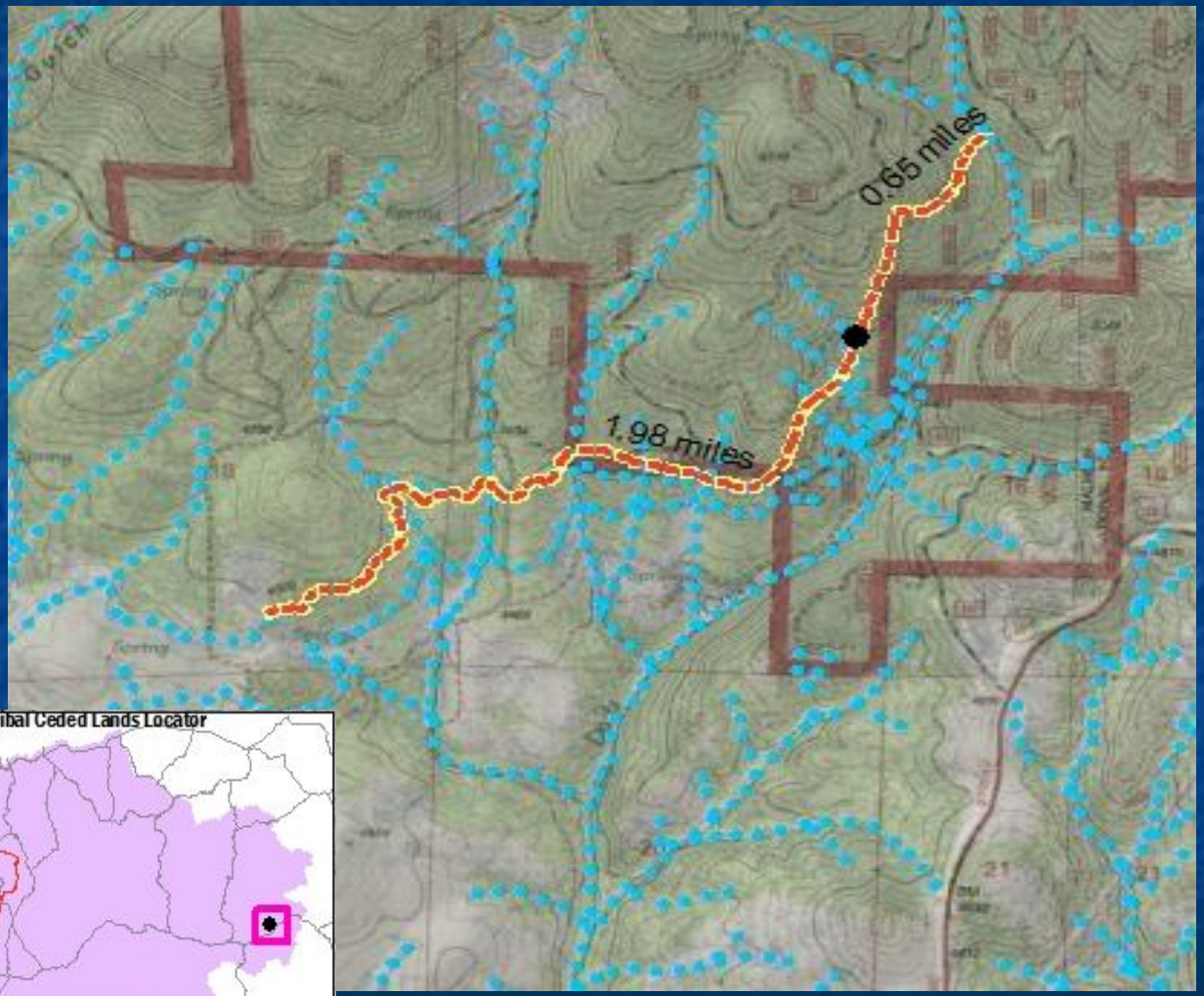
- Two ESA species steelhead and bull trout
- Chinook and lamprey

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Spring Chinook												
Spawning												
Rearing												
Migration												
Summer Steelhead												
Spawning												
Rearing (*1.)												
Migration	Holding		Enter Tribs					Enter JD		Holding		
Bull Trout												
Spawning												
Rearing												
Migration												
Pacific Lamprey												
Spawning												
Rearing (*2.)												
Migration (*3.)	Holding		Resume		Enter JD					Holding		

Irrigation Efficiency Study

- Develop detailed water budget for each irrigation ditch
  - $POD_{cfs} = POU_{cfs}$ + seepage + evapotransporation
- Create framework to allow managers to evaluate the benefit of piping projects

Dads Creek Ditch



$POD_{cfs} = POU_{cfs}$ + seepage +evapotransporation

- Stream flows weekly from June – Sept.
- Stage height daily

Flow complications

- Best method for low flow
  - Weirs
  - Flow trackers
- Inconsistent flow
- Logger technical issues

$POD_{cfs} = POU_{cfs}$ + **seepage** +evapotransporation

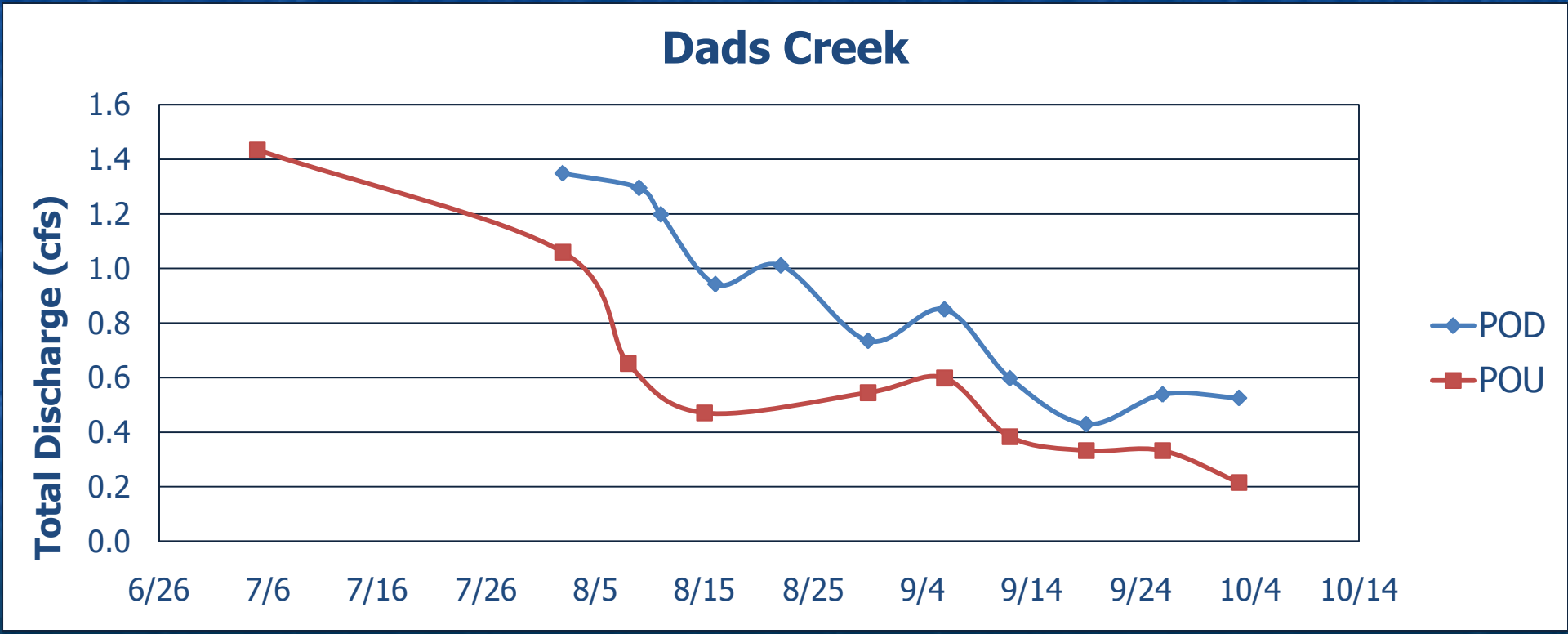
- Modified Idaho seepage meters
- Calculate seepage flux (ml/min)
- At least two per ditch

Seepage complications

- Seepage meter construction
- Hard substrates
- Broad soil categories

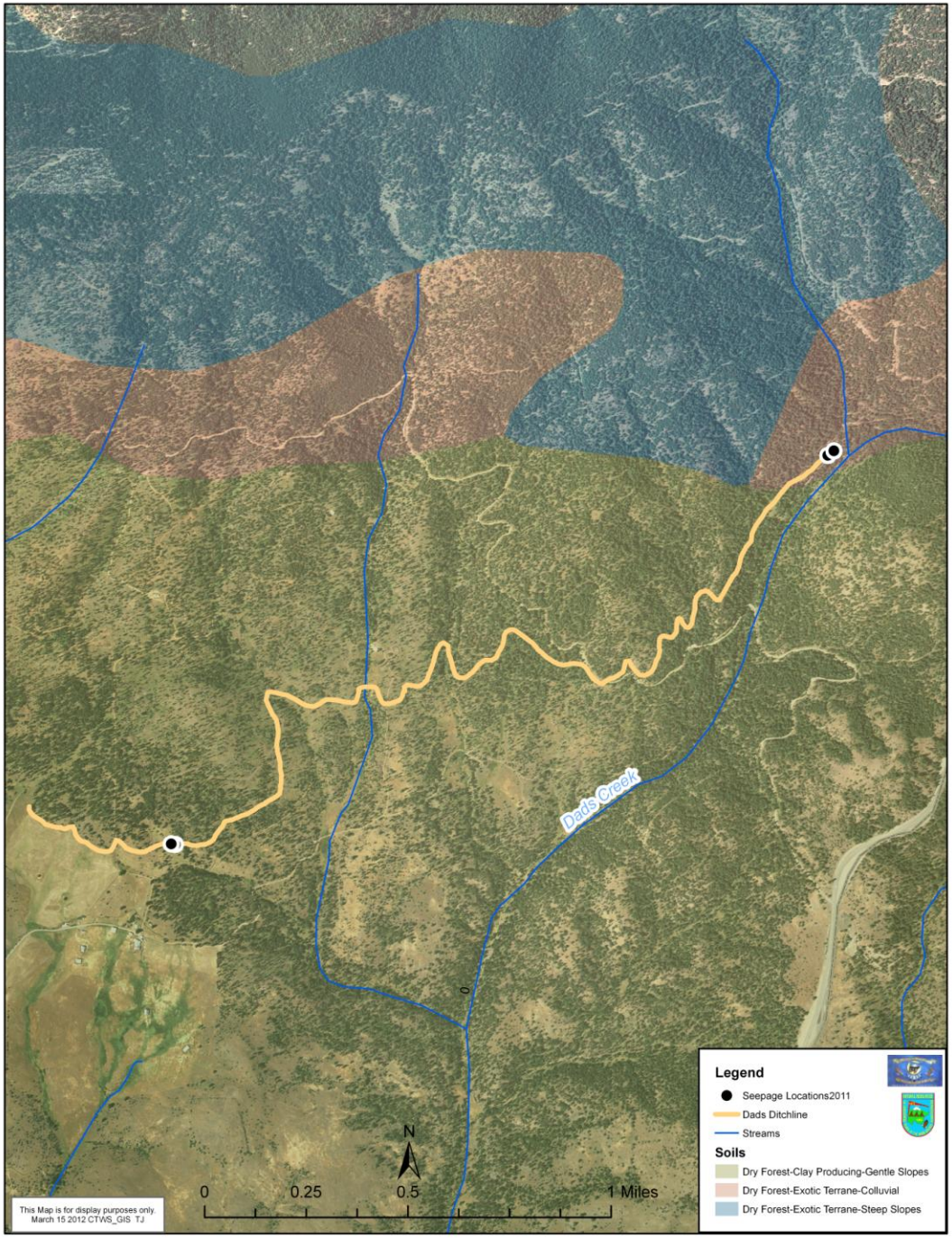
Results - Flow

- 0.64 – 0.1 cfs or 415,000 – 62,000 gallons/day



Results - Seepage

Seepage meter location	Average seepage flux (ml/min)
Dads POD plastic	-0.0042
Dads POD metal	-0.0054
Dads POU plastic	0.0005
Dads POU metal	0.0036


Dads Creek
Legend
Seepage Locations2011
Dads Ditchline
Streams
Soils
Dry Forest-Clay Producing-Gentle Slopes
Dry Forest-Exotic Terrane-Colluvial
Dry Forest-Exotic Terrane-Steep Slopes
N
0
0.25
0.5
1 Miles
This Map is for display purposes only.
March 15 2012 CTWS_GIS TJ

2012 Field season

- Staff continuity
- Longer data collection
- Resolved logger issues
- More detailed soil categories

Acknowledgements

- Patti Wright and Wendy Neal – CTWSRO
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Questions?
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