Where have All the Salmon Gone?

Joint Committee on Fisheries and Aquaculture

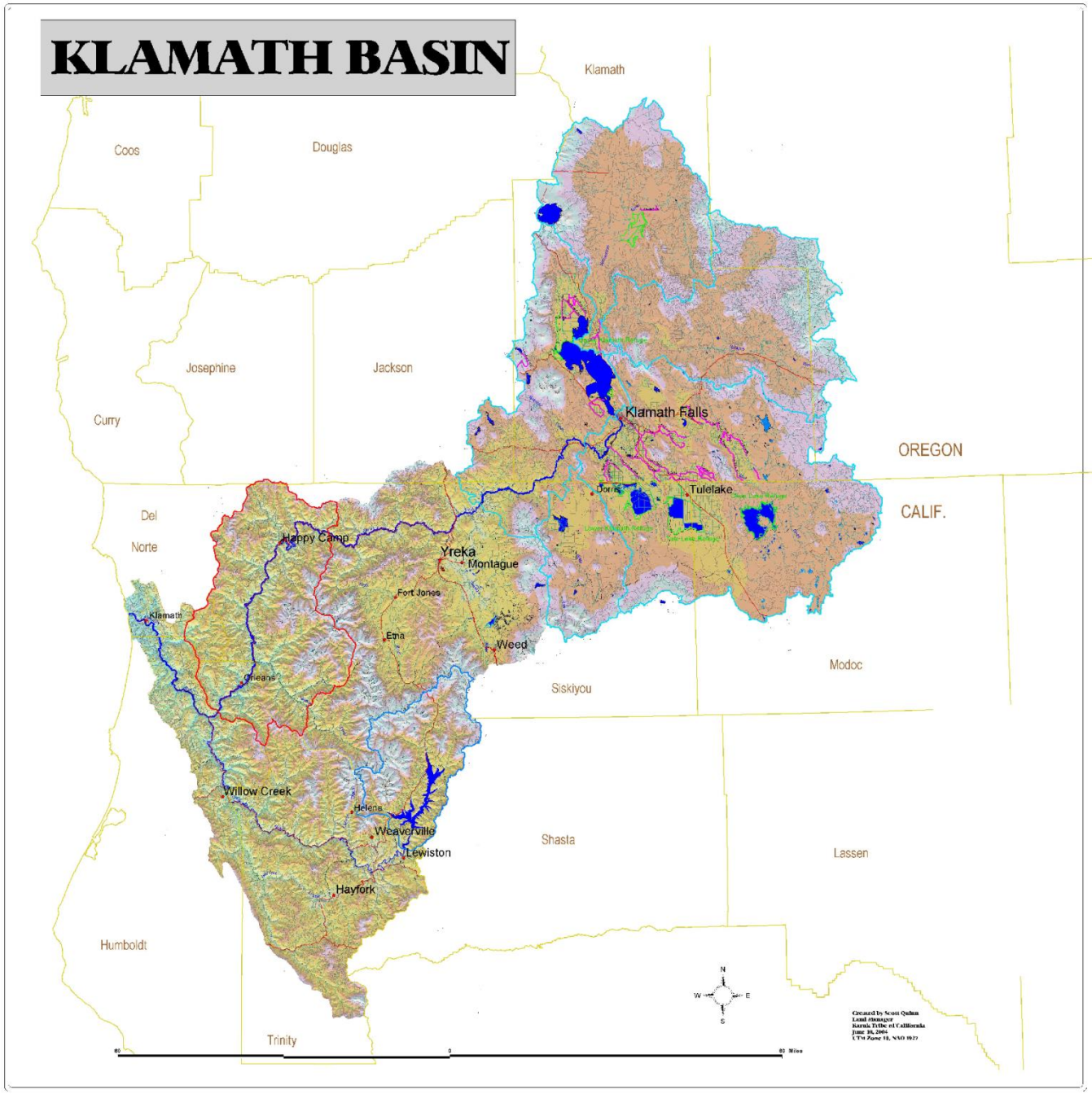
Hearing

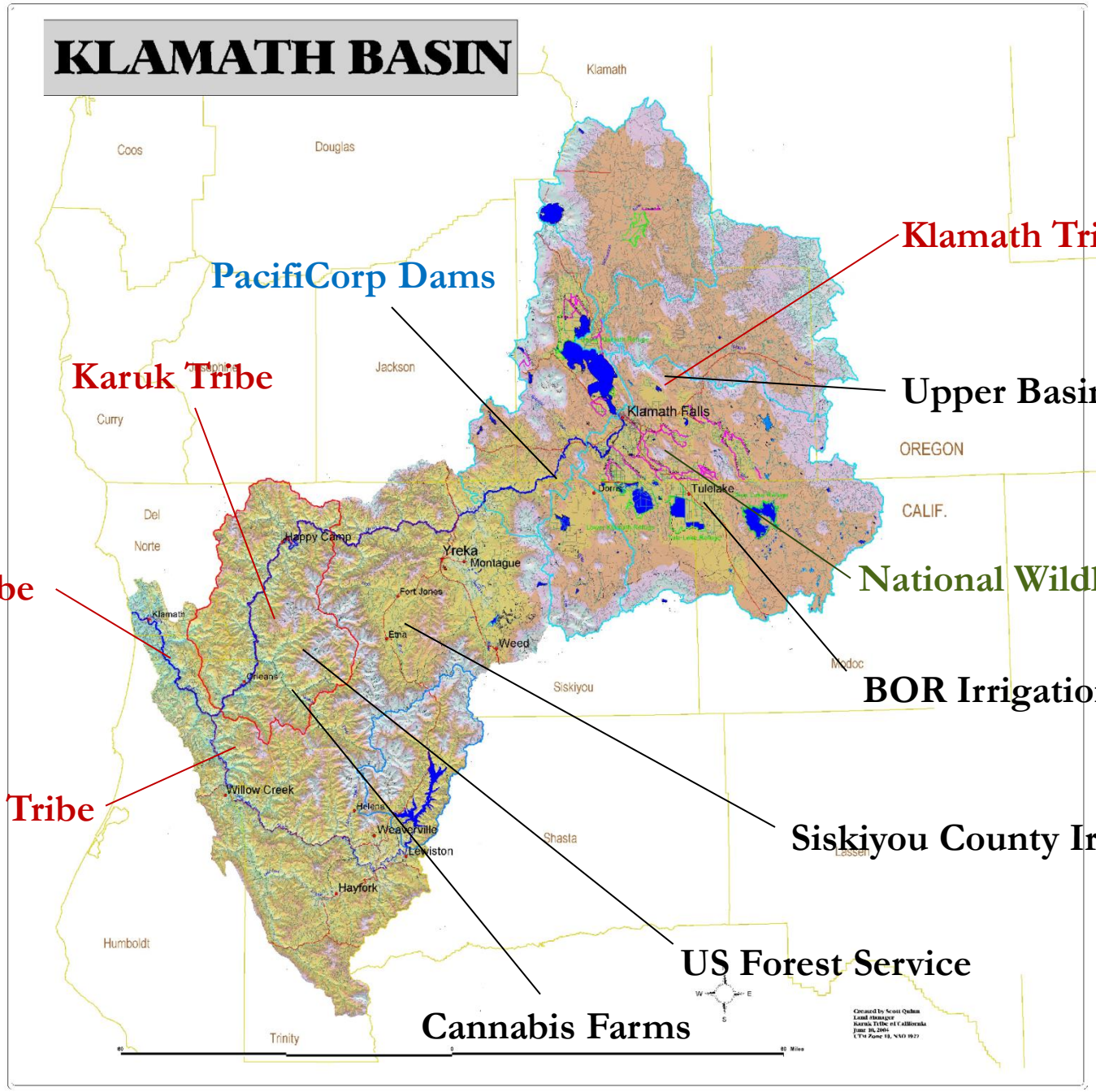
S. Craig Tucker, Ph.D.

Natural Resources Policy Advocate

Karuk Tribe

KLAMATH BASIN



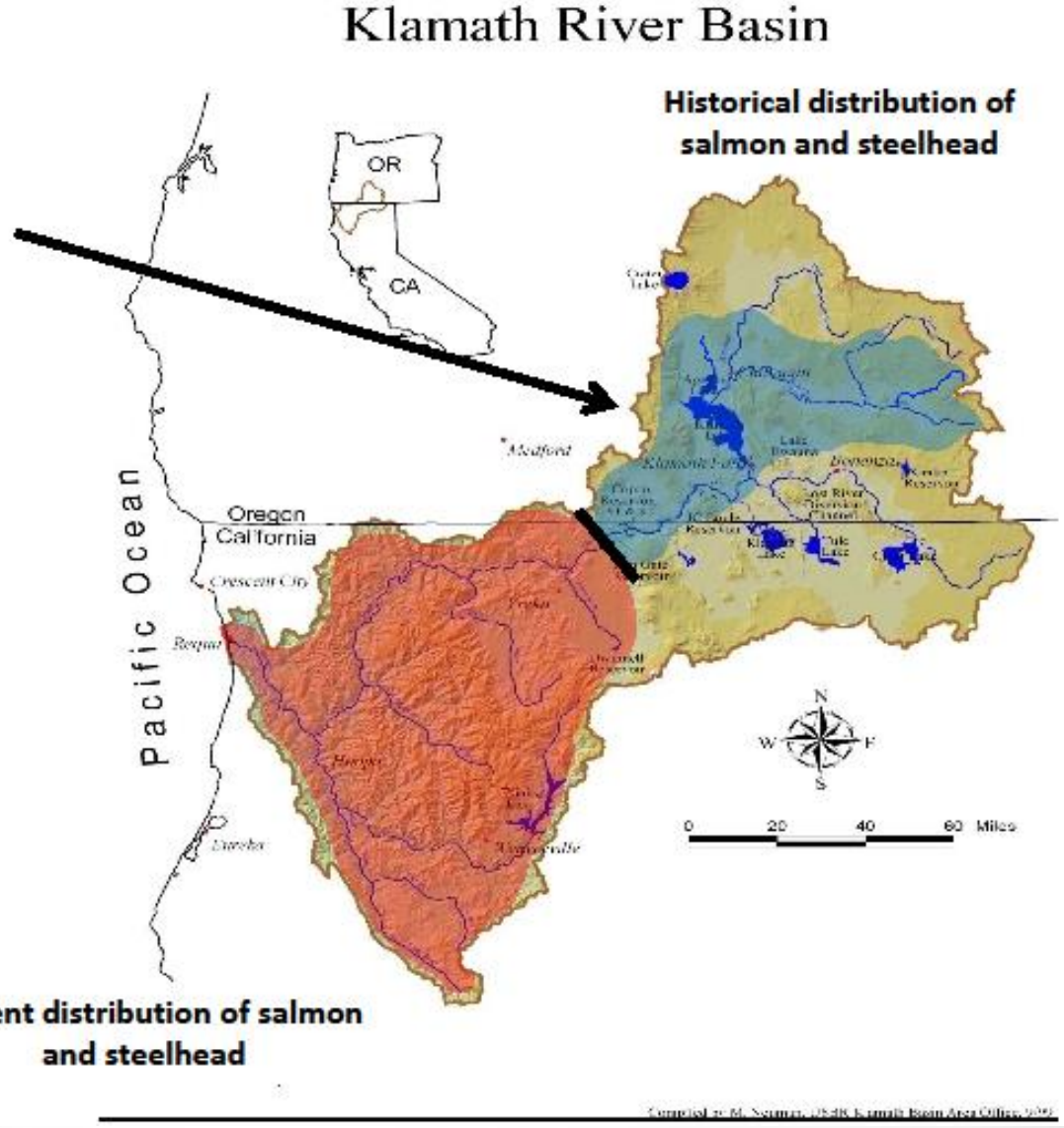

KLAMATH BASIN
Klamath
Coos
Douglas
Jackson
Curry
Josephine
Del Norte
Humboldt
Trinity
Shasta
Siskiyou
Modoc
OREGON
CALIF.
Klamath Falls
Tulelake
Yreka
Montague
Happy Camp
Fort Jones
Etna
Weed
Willow Creek
Hayfork
Weaverville
Lewiston
Helena
Orleans
PacifiCorp Dams
Klamath Tribes
Karuk Tribe
Upper Basin Irrigators
National Wildlife Refuges
Yurok Tribe
BOR Irrigation Project
Hoopa Valley Tribe
Siskiyou County Irrigators
US Forest Service
Cannabis Farms
OR
CA

Historic Abundance

"Parties coming in from Keno state that the run of salmon in the Klamath River this year is the heaviest it has [sic] ever known. There are millions of the fish below the falls near Keno, and it is said that a man with a gaff could easily land a hundred of the salmon in an hour, in fact they could be caught as fast as a man could pull them in…"

- Klamath Falls Evening Herald (1908)

Provides Salmon and Steelhead access to at least 420 miles of historical habitat.



Diversity is the Spice of Life

Fall Chinook

Spring Chinook

Coho Salmon

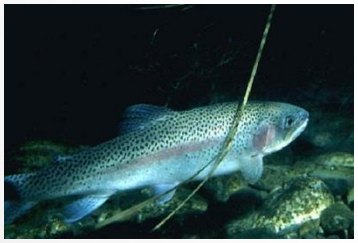
Pink Salmon

Mussels

Chum Salmon

Candlefish

C'wam



Winter Steelhead

Summer Steelhead

Pacific Lamprey

Green Sturgeon

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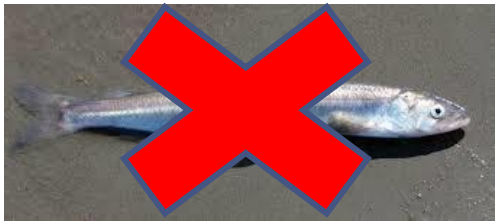

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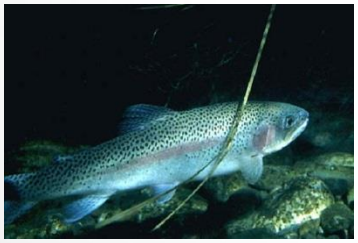

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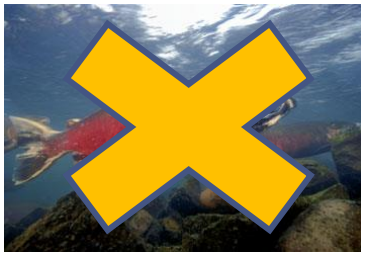

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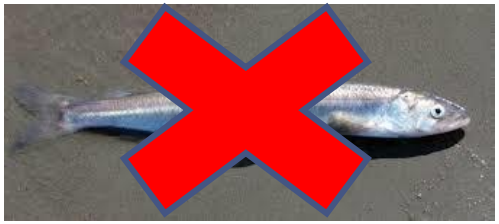

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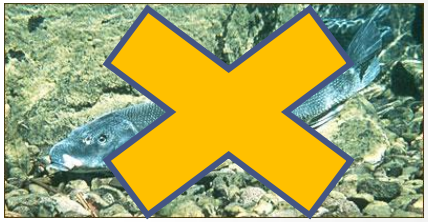

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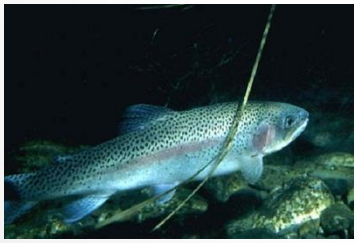

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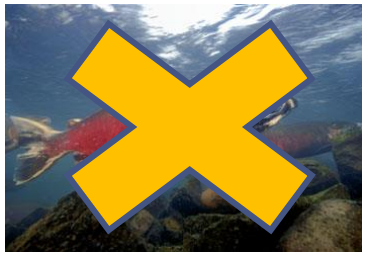

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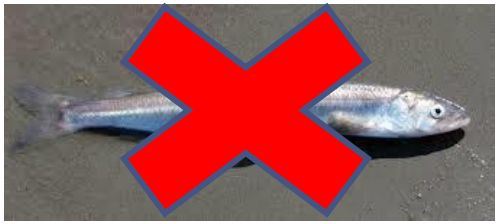

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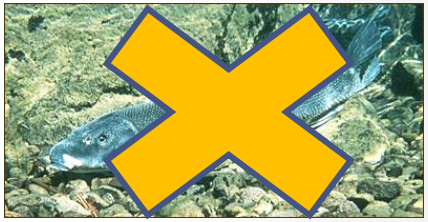

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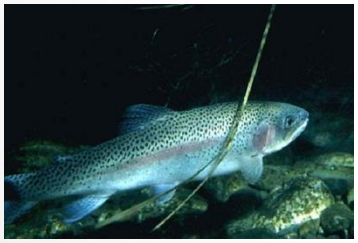

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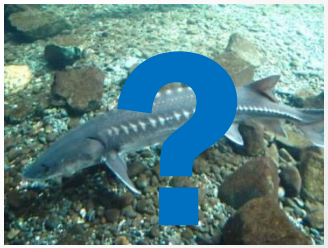

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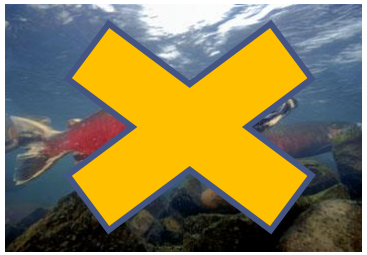

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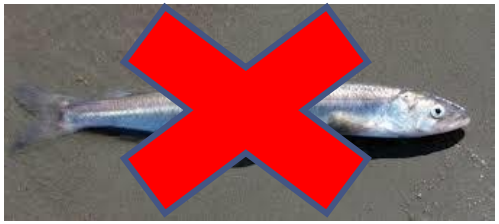

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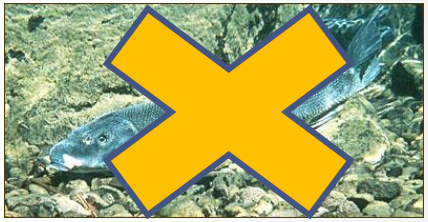

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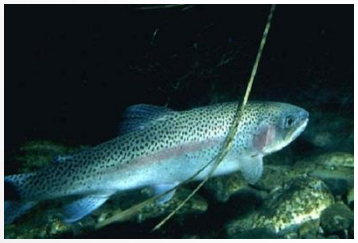

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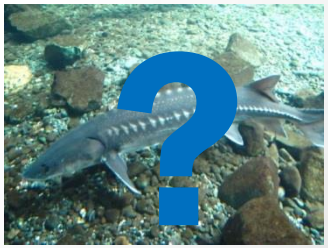
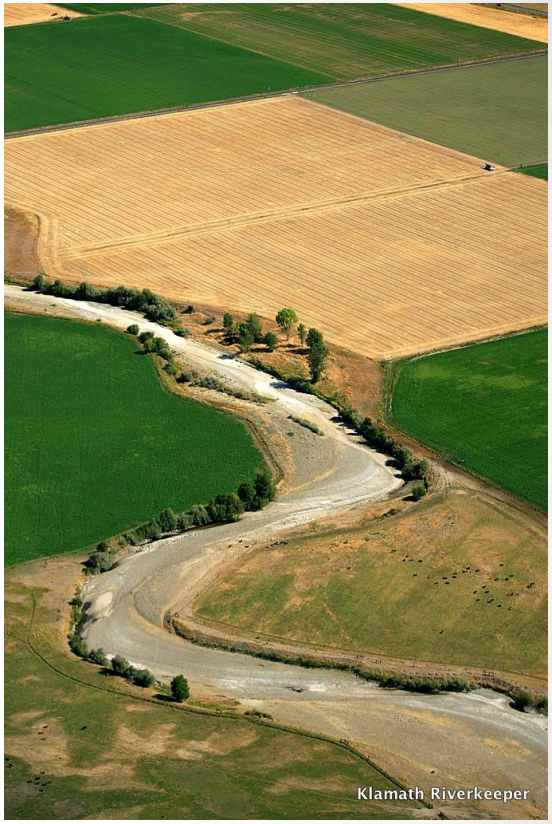


Green Sturgeon

What Happened?

Dams

Poor Land Management



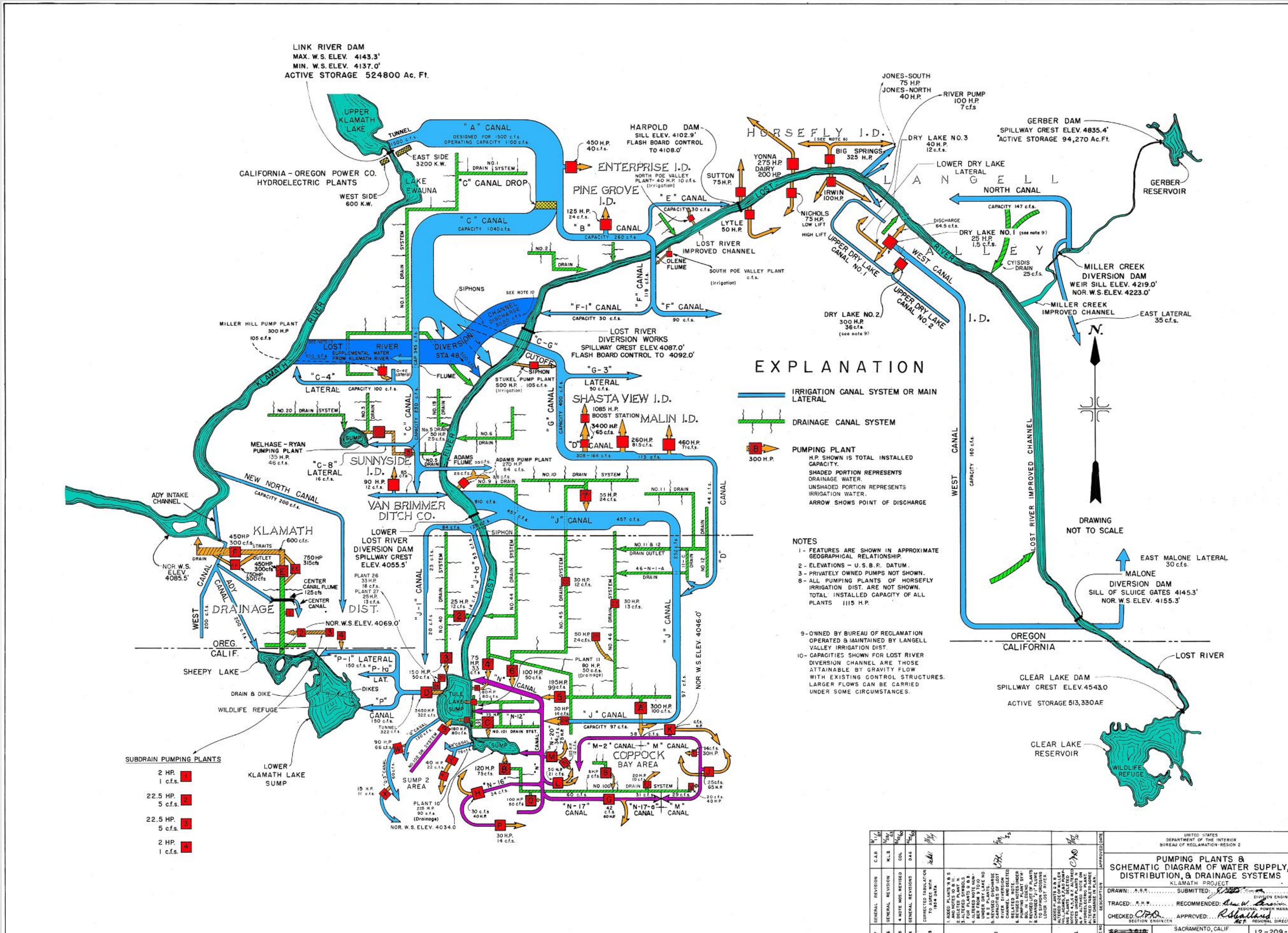
Unregulated GW

Irrigation Diversions

Gold Mining

Bureau of Reclamation Irrigation Project

- **BOR diversions at Upper Klamath Lake Controls main-stem flows in the Klamath *NOT* the dams targeted for removal**
- **220,000 acre project**
- **Construction started in 1906**
- **Drained over 80,000 acres of wetlands**
- **Diverts as much as 400,000 acre feet of water from Klamath River**
- **Its Complicated**



LINK RIVER DAM
MAX. W.S. ELEV. 4143.3'
MIN. W.S. ELEV. 4137.0'
ACTIVE STORAGE 524800 Ac. Ft.
UPPER KLAMATH LAKE
TUNNEL
"A" CANAL
DESIGNED FOR 1500 c.f.s.
OPERATING CAPACITY 1100 c.f.s.
EAST SIDE 3200 K.W.
CALIFORNIA - OREGON POWER CO. HYDROELECTRIC PLANTS
WEST SIDE 600 K.W.
LAKE EWAUNA
"C" CANAL DROP
"C" CANAL
CAPACITY 1040 c.f.s.
450 H.P. 40 c.f.s.
ENTERPRISE I.D.
PINE GROVE I.D.
"B" CANAL
"E" CANAL
HARPOLD DAM
SILL ELEV. 4102.9'
FLASH BOARD CONTROL TO 4108.0'
SUTTON 75 H.P.
YONNA 275 H.P.
DAIRY 200 H.P.
HORSEFLY I.D.
BIG SPRINGS 325 H.P.
IRWIN 100 H.P.
NICHOLS 75 H.P.
LYTLE 50 H.P.
LOST RIVER IMPROVED CHANNEL
OLENE FLUME
SOUTH POE VALLEY PLANT
JONES-SOUTH 75 H.P.
JONES-NORTH 40 H.P.
RIVER PUMP 100 H.P. 7 c.f.s.
DRY LAKE NO. 3 40 H.P. 12 c.f.s.
LOWER DRY LAKE LATERAL
LANGELL VALLEY I.D.
NORTH CANAL
DRY LAKE NO. 1 25 H.P. 1.5 c.f.s.
DRY LAKE NO. 2 300 H.P. 36 c.f.s.
UPPER DRY LAKE CANAL NO. 1
UPPER DRY LAKE CANAL NO. 2
WEST CANAL
GERBER DAM
SPILLWAY CREST ELEV. 4835.4'
ACTIVE STORAGE 94,270 Ac. Ft.
GERBER RESERVOIR
MILLER CREEK DIVERSION DAM
WEIR SILL ELEV. 4219.0'
NOR. W.S. ELEV. 4223.0'
MILLER CREEK IMPROVED CHANNEL
EAST LATERAL 35 c.f.s.
MILLER HILL PUMP PLANT 300 H.P. 105 c.f.s.
KLAMATH RIVER
LOST RIVER DIVERSION STA 48
LOST RIVER DIVERSION WORKS
SPILLWAY CREST ELEV. 4087.0'
FLASH BOARD CONTROL TO 4092.0'
"F-1" CANAL
"F" CANAL
"C-4" LATERAL
"C-G" CUTOFF
STUKEL PUMP PLANT 500 H.P. 105 c.f.s.
"G-3" LATERAL
"G" CANAL
SHASTA VIEW I.D.
MALIN I.D.
"D" CANAL
MELHASE - RYAN PUMPING PLANT 135 H.P. 46 c.f.s.
"C-8" LATERAL
SUNNYSIDE I.D.
ADAMS PUMP PLANT 270 H.P. 64 c.f.s.
NEW NORTH CANAL
ADY INTAKE CHANNEL
VAN BRIMMER DITCH CO.
"J" CANAL
KLAMATH DRAINAGE DIST.
ADY CANAL
CENTER CANAL FLUME
LOWER LOST RIVER DIVERSION DAM
SPILLWAY CREST ELEV. 4055.5'
NOR. W.S. ELEV. 4069.0'
OREG. CALIF.
SHEEPY LAKE
WILDLIFE REFUGE
LOWER KLAMATH LAKE SUMP
"P-1" LATERAL
"P" CANAL
TULE LAKE SUMP
SUMP 2 AREA
PLANT 10
"N-12"
"N-16"
"N-17" CANAL
"N-17-a" CANAL
"M-2" CANAL
"M" CANAL
COPPOCK BAY AREA
NOR. W.S. ELEV. 4034.0
NOR. W.S. ELEV. 4046.0'
SUBDRAIN PUMPING PLANTS
EXPLANATION
IRRIGATION CANAL SYSTEM OR MAIN LATERAL
DRAINAGE CANAL SYSTEM
PUMPING PLANT
H.P. SHOWN IS TOTAL INSTALLED CAPACITY.
SHADED PORTION REPRESENTS DRAINAGE WATER.
UNSHADED PORTION REPRESENTS IRRIGATION WATER.
ARROW SHOWS POINT OF DISCHARGE
NOTES
1 - FEATURES ARE SHOWN IN APPROXIMATE GEOGRAPHICAL RELATIONSHIP.
2 - ELEVATIONS - U.S.B.R. DATUM.
3 - PRIVATELY OWNED PUMPS NOT SHOWN.
8 - ALL PUMPING PLANTS OF HORSEFLY IRRIGATION DIST. ARE NOT SHOWN. TOTAL INSTALLED CAPACITY OF ALL PLANTS 1115 H.P.
9 - OWNED BY BUREAU OF RECLAMATION OPERATED & MAINTAINED BY LANGELL VALLEY IRRIGATION DIST.
10 - CAPACITIES SHOWN FOR LOST RIVER DIVERSION CHANNEL ARE THOSE ATTAINABLE BY GRAVITY FLOW WITH EXISTING CONTROL STRUCTURES. LARGER FLOWS CAN BE CARRIED UNDER SOME CIRCUMSTANCES.
N.
DRAWING NOT TO SCALE
EAST MALONE LATERAL 30 c.f.s.
MALONE DIVERSION DAM
SILL OF SLUICE GATES 4145.3'
NOR. W.S. ELEV. 4155.3'
LOST RIVER IMPROVED CHANNEL
OREGON
CALIFORNIA
LOST RIVER
CLEAR LAKE DAM
SPILLWAY CREST ELEV. 4543.0
ACTIVE STORAGE 513,330 A.F.
CLEAR LAKE RESERVOIR
WILDLIFE REFUGE
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION - REGION 2
PUMPING PLANTS & SCHEMATIC DIAGRAM OF WATER SUPPLY, DISTRIBUTION, & DRAINAGE SYSTEMS
KLAMATH PROJECT
SACRAMENTO, CALIF
JULY 1, 1949
12-209-3

BOR Manages Klamath Flows

- **Klamath River flows are controlled by the outflow of Upper Klamath Lake (Link River dam)**
- **Are a function of BOR Irrigation Plan**
- **Irrigation Plan is subject to Biological Opinion**
- **Considers needs of ESA listed coho (NOAA) in river and suckers in the lake (USFWS)**
- **Establishes Minimum Klamath River flows and lakes levels that vary by hydrologic conditions**

BOR Manages Klamath Flows

BOR's legal obligations are:

1. **Comply with ESA, i.e. 'prevent jeopardy' of listed species**
2. **Meet agricultural demands**
3. **Supply National Wildlife Refuges with water**

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United States fails to meet Tribal Trust obligations

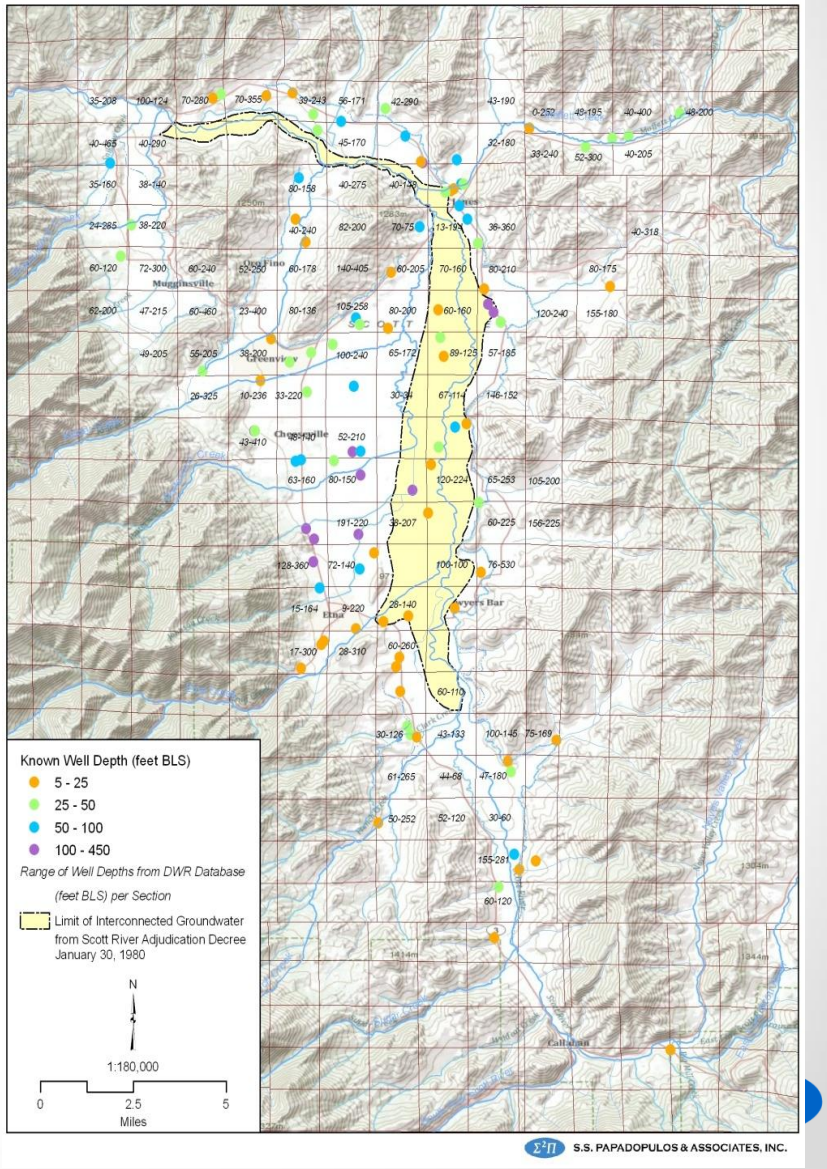
CA Has Tools to Help

- Decision to allow (or not) Suction Dredge Mining
- Enforce Fish and Game Code 5937
- Require bypass flows in 1602 Agreements
- Re-adjudicate over appropriated sub basins
- Participate in intergovernmental management activities
- Pass AB 975, CA Wild and Scenic Rivers Improvement Act

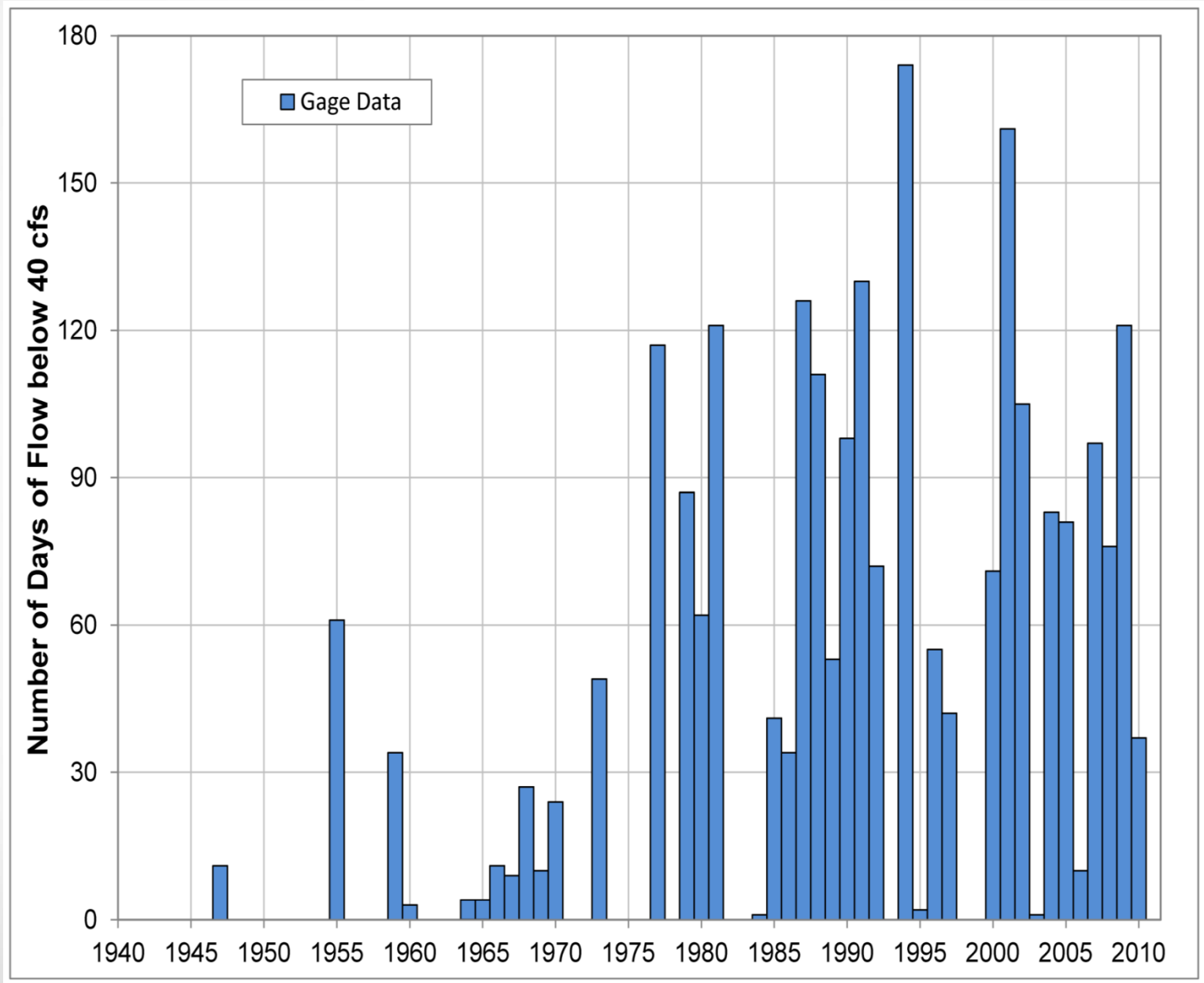
Use 1600 and 5937 to Require Minimum Flows in Scott and Shasta

Adjudicate and Regulate Scott Valley GW

- Pumping is not measured
- New irrigation wells may be drilled outside of “interconnected” zone delineated for Scott River Decree (CA SWRCB, 1975)
- Numbers of wells suggest increased groundwater diversions over time
  - 99 irrigation wells in 1979;
  - 130 irrigation wells in 1999;
  - 172 irrigation wells in 2010.
- Groundwater use offsets late-season surface water shortage and extends growing season during dry years



Number of Days with Flow at Ft. Jones below 40 cfs



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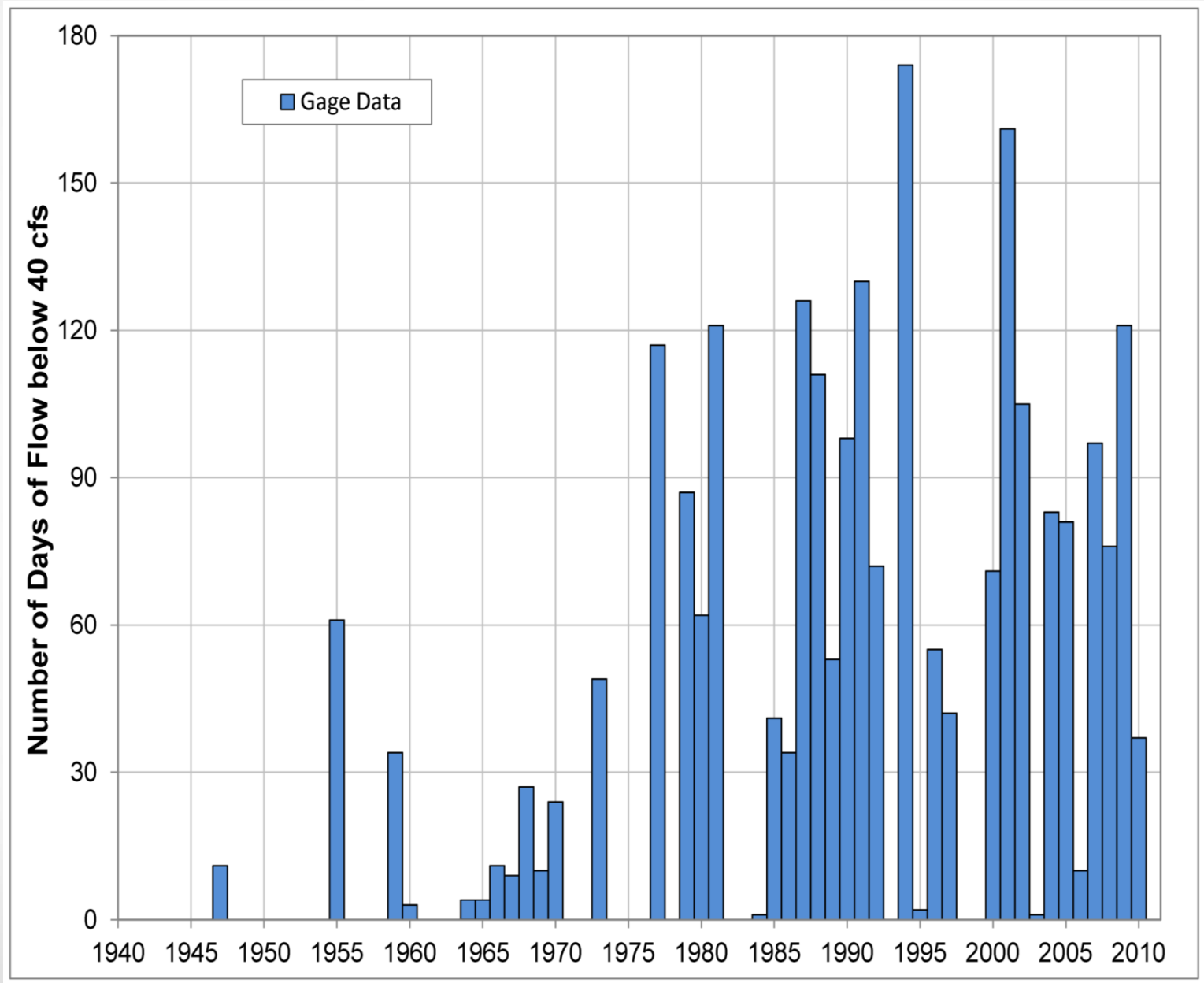
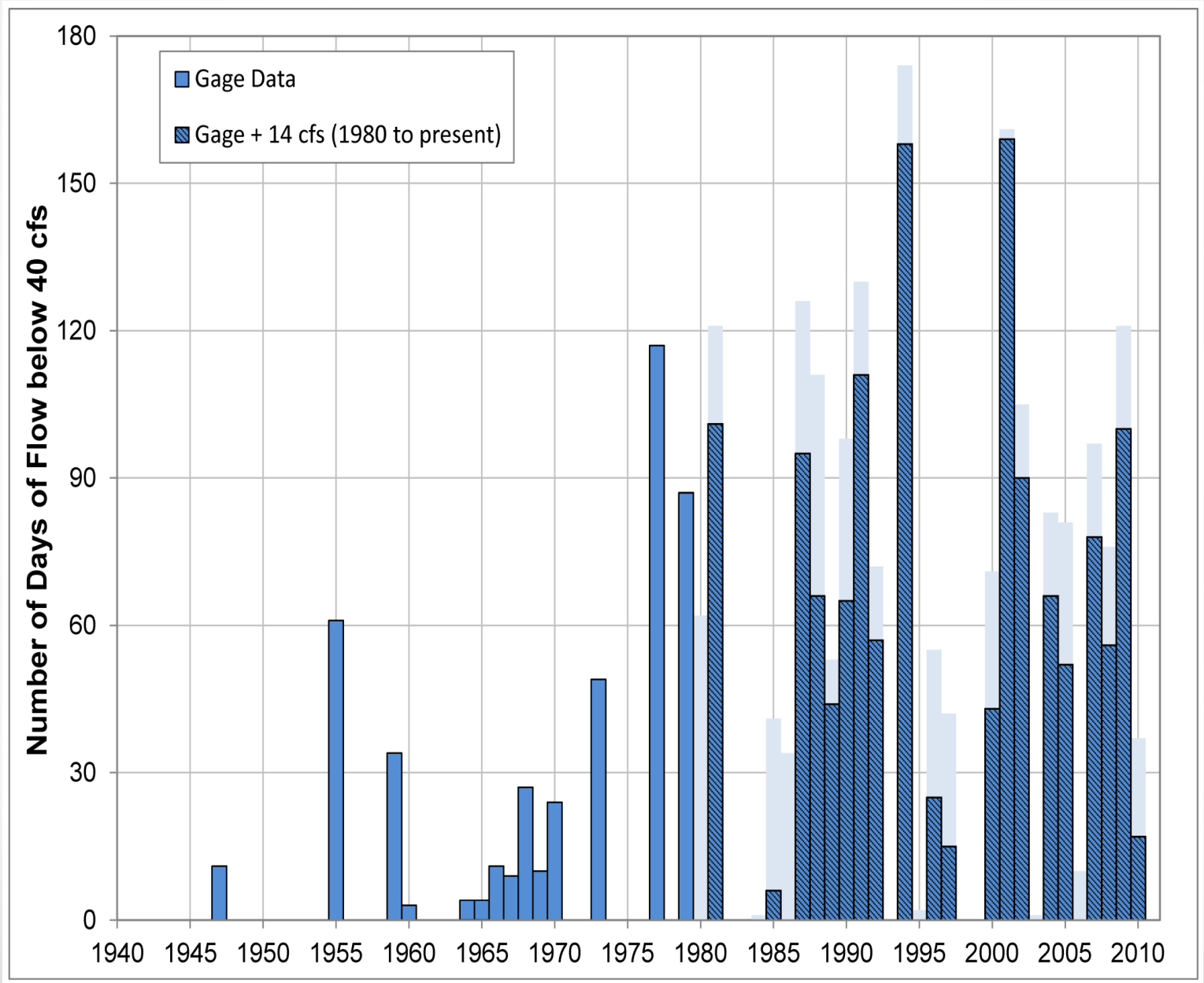
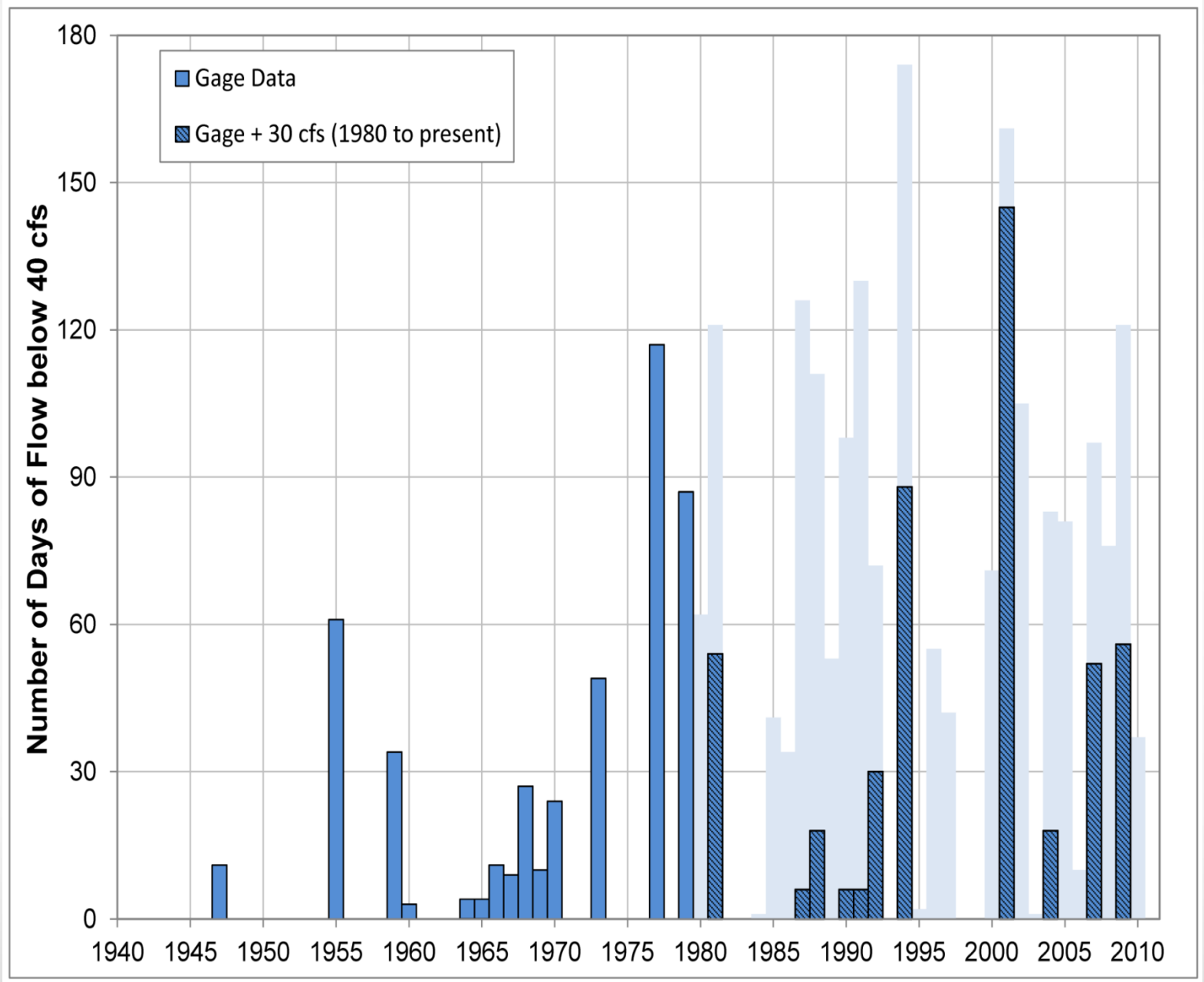


with post-1980 14 cfs adjustment (est. climate influence)



influence)


Gage Data
Gage + 30 cfs (1980 to present)
Number of Days of Flow below 40 cfs
0
30
60
90
120
150
180
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010