Anatomy of a community-based stream restoration project

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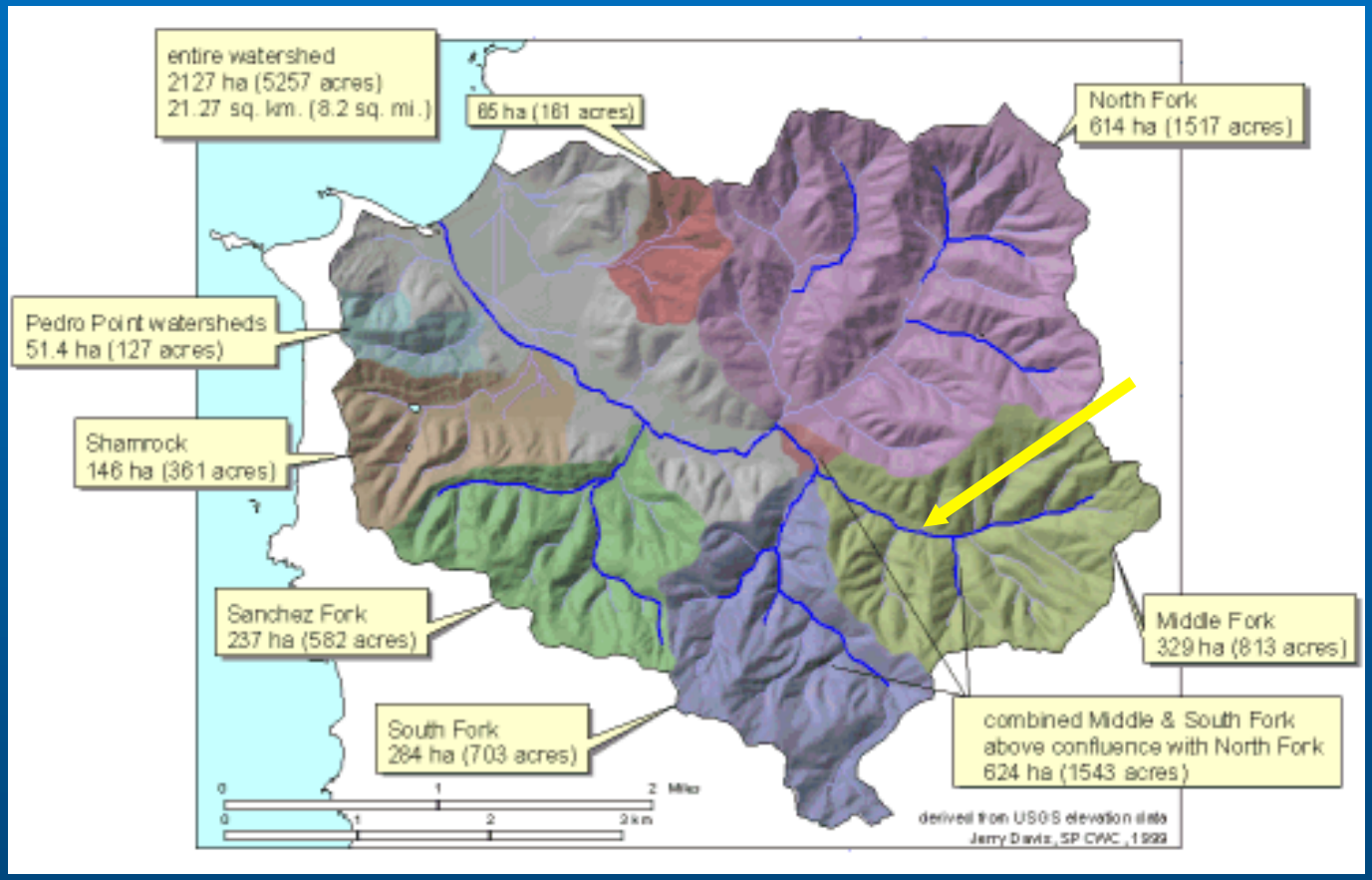
in cooperation with the

San Pedro Valley County Park and the San Pedro Valley Watershed Coalition

Project Location



Project Goals

- **Remove a barrier to fish migration**
- **Restore streamside habitat**
- **Demonstrate the effectiveness of the newly formed SPCWC**
  - **an early success**

Description

- **Remove a 26’ long x 6’ diameter concrete culvert**
- **Lay back the banks, stabilize the site, re-vegetate with native plants, replace crossing with a new bridge**

Early Expectations and Constraints

- **Inexpensive**
  - **$20,000 to $30,000 estimate**
  - **would use railcar**
- **National Fish and Wildlife Grant**
- **Relatively easy to do**
- **Permitting not too complicated**

First Steps

- **Perform physical site inspection, cross sections, and longitudinal profile**
- **Biological assessment**
- **Estimate cost for bridge and materials**

First hints of trouble

- Need free-standing bridge, rated for fire truck access
- Rail cars are expensive, not available, often have lead-based paint
- Engineer needs detailed geotechnical report and site survey
  - expensive, and means another contract
- Bridge costs = total available!!
  - fund raising begins!!@##$$%%#!!

Design Requirements

- **45-foot long free-standing bridge**
  - **fire truck, equestrian, bicycle safe**
  - **self-maintaining**
- **Massive engineering**
  - **Abutments**
    - **either 20’ wide x 10’ high x 8’ footer or**
    - **6 piers, 2’ diameter x 28’ depth with massive rebar cages and**
  - **Weirs**
    - **8 weirs with16 quarter-ton boulders per weir**

Permits: Oh the joy!

- **Used JARPA**
  - **Some agencies confused process**
  - **County wouldn't go forward without reconciliation**
  - **Some took months to reply, then no comment**
  - **Used Regional General Permit no.1 for 404 permit from Corps of Engineers**
  - **Needed separate 1601 Agreement from DFG**

Permits, continued

- **Took over 1 year! @##$$%%#**
  - **Received the 1601 Agreement a few days before construction because DFG was caught in a "Catch 22"**
  - **There were surprises!**
    - **County Building Inspector issue**

Original Schedule

- JARPA in spring 2000
- Permits in July 2000
- Construction in Sept 2000

Actual Schedule

- JARPA in spring 2000
- Permits July 2001
- Construction July-Nov 2001

Contracting and Construction

- Urban Creeks Council for survey, design, and construction
- JC Engineering for civil engineering
- Earth Investigations for geotechnical engineering
- Wheeler Bridge Company for the bridge
- Brodhead Steel for the rebar cages
- Power Engineering for excavator work

Contracting and Construction, continued

- **Collin Tiura and Daughters for drilling and bridge setting**
- **Go Native for construction, erosion control (donated!!)**
- **San Mateo County for construction, form building, concrete, site cleanup, debris disposal**
- **Trucker, pumpers, rock, erosion control materials**

OK, Build It!

- **Need more money**
  - **sought funds from RWQCB, County Parks Foundation**
  - **reprogrammed funds in NFWF grant**
- **Line up contractors**
  - **get estimates**
  - **sign contracts**

OK, Build It! continued

- **Develop detailed construction schedule**
- **Order materials and supplies**
  - **signs, fencing, porta potty, nets, pump, hose, flagging, trash can**
- **Send checks for bridge, rebar cages, etc.**

Construction Steps

- **Demolition**
- **Drilling**
  - **oops, broke an auger and extractor!**
  - **needed cutting torch for rebar**
  - **created an attractive nuisance**
- **Bank contouring**
- **Erosion control blanketing**

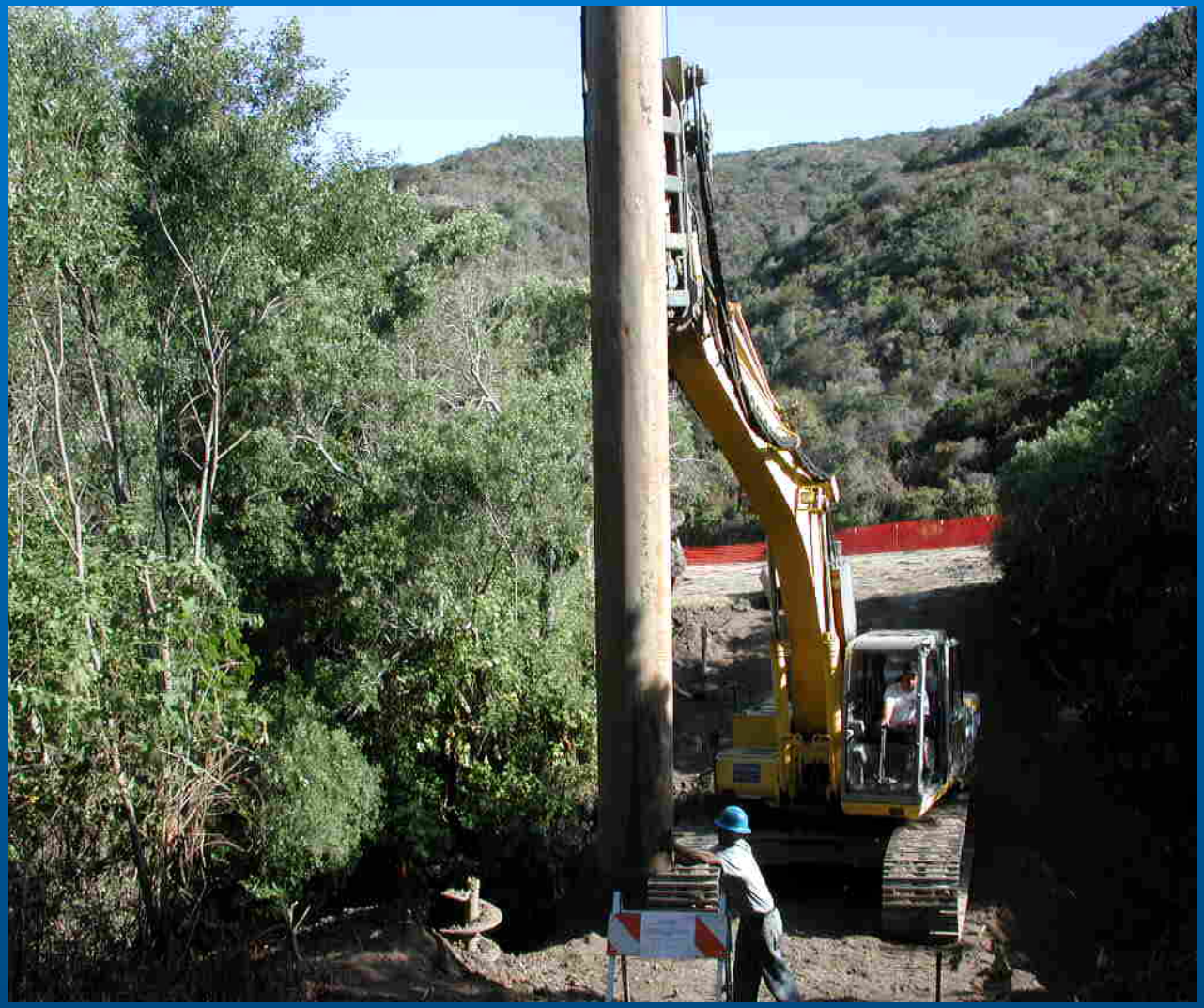
Drilling holes for piers, installing casing and rebar cages

Drill rig and pumper; surveying elevation of piers and abutments

Setting casing before setting rebar cage and pouring concrete

NOTE: rebar cage set high due to broken auger and extractor at bottom of hole

Dropping the 30’ long casing into drilled holes prior to pumping concrete



Constructing rock weirs; excavating step pool

Erosion blanket installed, piers stubbed out, ready to build abutment forms

Construction Steps, continued

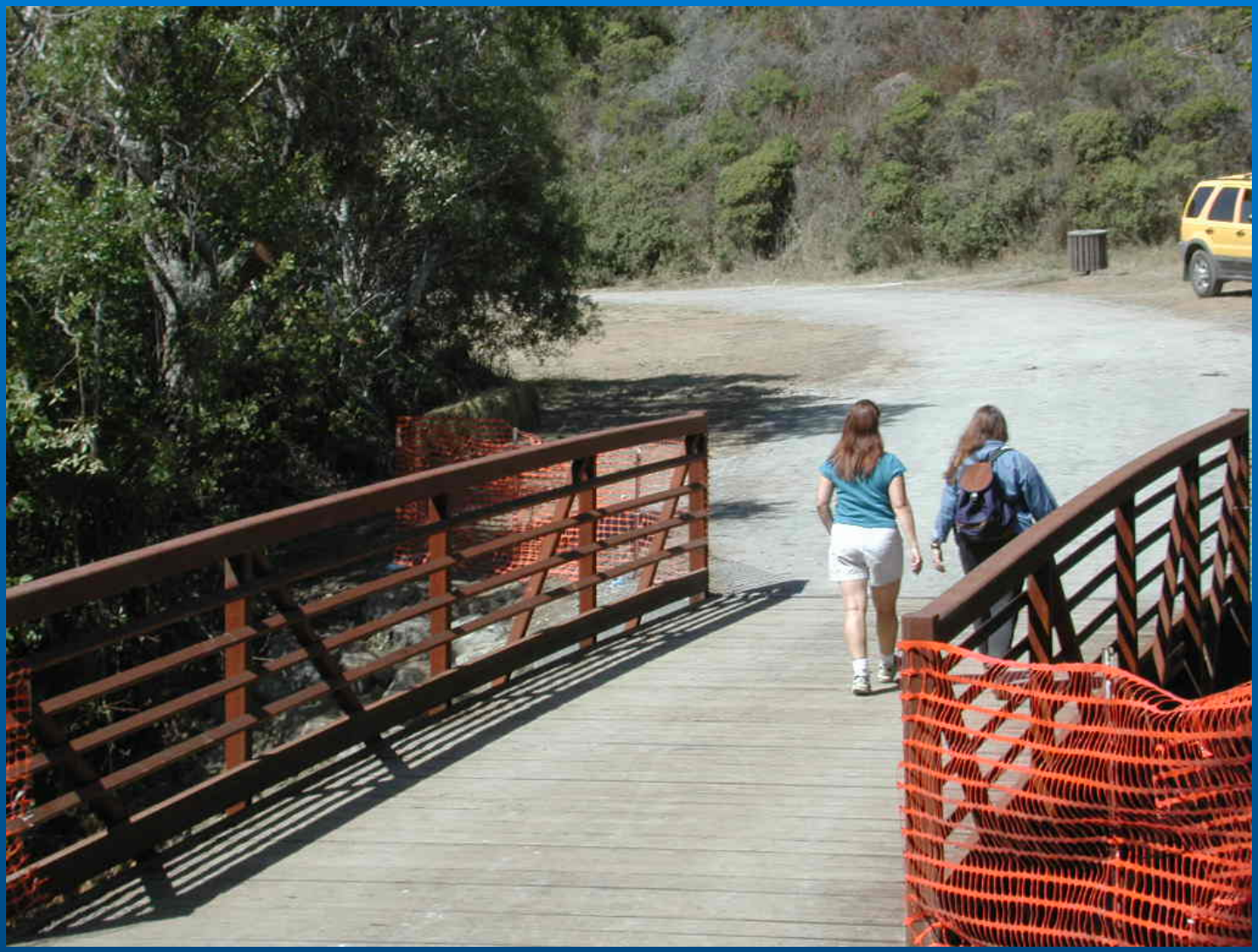
- Soil bio-engineering
- Weir construction
- Building the forms for the abutment and pouring concrete
- Setting bridge
- Site cleanup, grading, planting

Pumping concrete into the abutment forms

Lifting the bridge off the truck

Setting the bridge on the abutments

View from the channel of the near-finished product



The first hikers cross the new bridge

Realities

- Personnel issues
- Last minute complications
- SPCWC and the City of Pacifica had joint fiscal responsibilities
  - makes for messy tracking of funding
- Hard to figure out permit requirements
  - inconsistent and not always clear

Monitoring

- quarterly reporting
- troubleshooting
- pounded in the first month
  - 8” rain in 48 hr
  - 22” in December!
    - most rain in that month since 1956

Final Costs

- **Projected: $30,000**
- **Actual: $75,000**
- **Actual costs not including in-kind contributions**
  - **County**
  - **SPCWC and EPA**
  - **Go Native, Power Engineering, and JC Engineering**
- **Total probably closer to $125,000**

Lessons Learned

- **Permitting takes a long time**
  - ***even longer that you think!***
- **Costs can skyrocket**
  - **civil and geo-engineering**
  - **materials**
  - **professional services**
  - **cost overruns (driller, bridge setting)**
- **“Good planning” is sometimes not good enough**
- **Be flexible, as things happen**
- **Add at least 25% to the estimated project cost for contingencies**

First storm: so far, so good! This was an 8” storm event