TIOGA APPENDIX : UPPER TIOGA CREEK STREAM & CWD DIAGRAM

This appendix contains:
- Tioga Creek Photo Survey and Diagraming Procedure
- Two composite diagrams of Tioga Creek with
- The seven diagrams showing coarse woody debris down stream from Wilson's Folly Creek

TIOGA CREEK PHOTO SURVEY AND DIAGRAMING PROCEDURE

John Colby, Michael Rodriguez
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BALLOON-CAM

In August 1995 a helium balloon with attached camera platform was used for a low altitude survey of Tioga Creek. The survey was completed by Michael Rodriguez, John Colby, Mark Storzer, and Mike Kellett under the direction of Frank Price. The device, previously used by John Anderson, former District Fisheries Biologist, was discovered in the warehouse minus operating instructions. To facilitate future use of the balloon cam, an equipment list and operating procedures follow.

Balloon-cam Equipment List

- six-foot diameter weather balloon
- orange nylon balloon shroud
- at least 3 small helium tanks (44 cubic feet each; get tanks filled at Coos Bay Welders Supply)
- camera platform (including battery pack and radio-controlled servo)
- camera (Olympus OM-1N) with auto-winder and single focal length lens
- radio controller (Challenger 250)
- film
- twelve batteries (4 for battery pack on platform, and 8 for radio controller); spare batteries (for camera, battery pack on platform, and for radio controller)
- two fishing poles with monofilament line and bait-casting reels (mark the line to indicate length of line that has been fed out)
- ten-foot long x one-foot wide white vinyl fabric strip for indicating northward direction and scale in photo. Attach to a bamboo frame or piece of wood for ease of placement on uneven ground.
- compass (for orienting North arrow)
- hand-held counter (for keeping track of when to unload film, thereby avoiding the film being pulled out of the cartridge by the auto-winder)
- parachute chord (to tether the balloon)
- large backpacks (for hauling the helium tanks and other gear)
- duct tape and rubber bands

The shroud, one spare weather balloon (check for leaks before going to the field), camera platform, and remote control are stored on top of the photographic equipment locker in the warehouse.

Handling the Balloon

When filling the weather balloon inside the shroud, a few precautions must be taken to avoid scuttling the project all together. Choose a relatively open patch of ground to minimize the chance that the balloon will abrade against surrounding logs, vegetation, etc. A tarp provides an effective barrier between the thin-skinned balloon and sharp objects. When filling the balloon, secure the shroud to the neck of the helium tank to avoid escape.

One small helium tank (containing approximately 44 cubic feet of gas) can be emptied in roughly two and a half minutes with the valve wide open. It takes approximately two and a quarter tanks to lift the loaded camera platform. Weather balloons slowly leak helium, so periodic recharging is necessary.

A shroud wet with rain or morning condensation will ground the balloon cam. It is not know if the addition of helium can compensate for a partially wet shroud. During the Tioga Creek project, drying of the balloon (after tethering overnight inflated) and the removal of the camera motor drive were needed for flight after the helium supply had been exhausted.

A nearly windless day is necessary in order to keep control of the balloon. Even slight breezes can make the balloon difficult to control. It may be possible to control the balloon better, and may save time, by shooting a greater number of pictures at a lower elevation.

Camera and Film

Rubber bands are useful when mounting the camera to the platform. The camera has to be held under tension in the cradle to ensure that the action of the servo doesn't disrupt the focal plane. Servo lever travel should be adjusted, via the remote controller, to the point where it just trips the shutter. The motor drive attached to the camera should be mounted without batteries. The four AA batteries used to power the servo also provide power for film advance when

the red plug-in is inserted into the auto-winder.

Two single-focal-length lenses, a 50mm and a 28mm, were used to document stream/floodplain interaction from a height of 100 feet (see attached photos for coverage provided by each lens). Given the scope of the Tioga Creek project (documenting one-eighth to one-quarter mile of stream), it was decided that the wider angle 28mm lens should be used despite distortion concerns. Control of the balloon and proximity of riparian trees precluded use of the balloon at heights in excess of 100 feet; increased height would have favored use of the 50mm lens (perspective of the human eye).

Future users of the balloon-cam with the 28mm lens on board are advised to secure the guy lines, not to the base of the camera platform, but to the loops provided at the base of the shroud. Guy lines coming from the styrofoam platform appear in numerous Tioga Creek photos. In cases where photographing the rigging is unavoidable, darker line will minimize the contrast between the subject and the rigging.

Kodak Royal Gold 400 film delivered the best results during midday shooting with mostly cloudy skies; aperture setting 5.6 and shutter speed 125. Film speed, shutter setting, and balloon control combined to produce only one blurred picture during the survey. Shutter speeds less than 125 were not attempted, but should be considered for early evening or early morning photography given orographic shading. Regardless of camera settings, releasing the shutter slightly before the balloon tugs at the tethers is advisable.

PHOTO SURVEY FROM GROUND

The photo survey was done using a camera mounted on a tripod. The camera used was an Olympus OM-1N with a 28-105mm Vivitar Series-1 lens. All photos were taken at 28mm. 200 ASA Fujicolor film was used. Some photos were taken with black-and-white film but were not as useful as the color photos. Fairly long exposures of up to 1/4 second were sometimes necessary due to the low light, but blurry photos were not a problem with use of the tripod. An aperture of at least 5.6 was used in order to get good depth of field. Two photos were taken from each station: one at the metered aperture and shutter speed, and one at 2 f-stops less then the metered settings. Bracketing of one f-stop produced negligible differences in photos. As with the balloon-cam photos, the best results were obtained when photos were taken during overcast days.

The photo survey was done as follows. A 10-foot long range pole (leveling rod) was included in each photo for scale, and in some cases a human holding the pole. Scale was easier to visualize with the human in the photo. To start, a photo was taken looking downstream. The camera was then moved downstream to a point that could be easily seen in the downstream photo, and a photo was taken looking upstream to where the first photo was taken. Then from the same point, a photo was taken looking downstream. Then the camera was moved downstream, and the same procedure continued until the survey was complete. Panoramic photos were taken in places where one photo was not adequate to cover the survey area. A few photos were also taken from up on the bank, looking down on the stream to give a better perspective of certain areas. A photo of a number indicating the order of the roll of film was taken at the beginning of each roll of film to help keep the photos and negatives organized.

DIAGRAMS

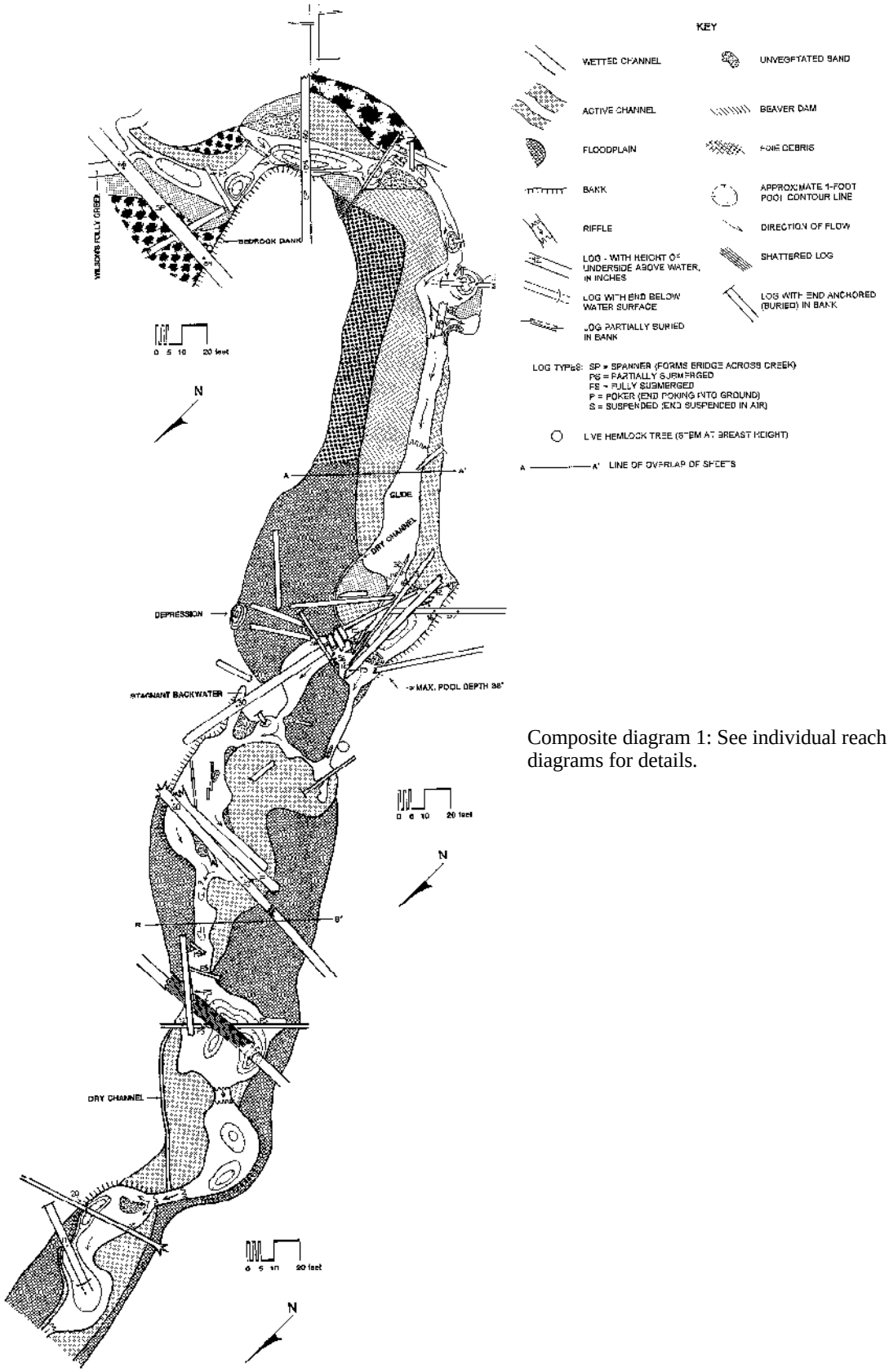
The stream diagrams were made by first sketching the stream in the field, annotating the sketch, and then transferring the information to another sheet in the office, to the correct scale and orientation. An intermediate sketch was made and then traced to produce the final version of the diagrams. The intermediate sketches were also photocopied and taken to the field to check the accuracy of the diagrams and fill in missing information. The information that was collected in the field was 1)dimensions and orientation of each stream segment and associated active channel and floodplain; 2)length, diameter, and orientation of each log; 3) height of bottom of each log above water surface; 4)location and DBH of each live tree within the floodplain; 5) locations and types of stream banks; 6)depths and configurations of pools; and 7) general notes.

TIME BUDGET

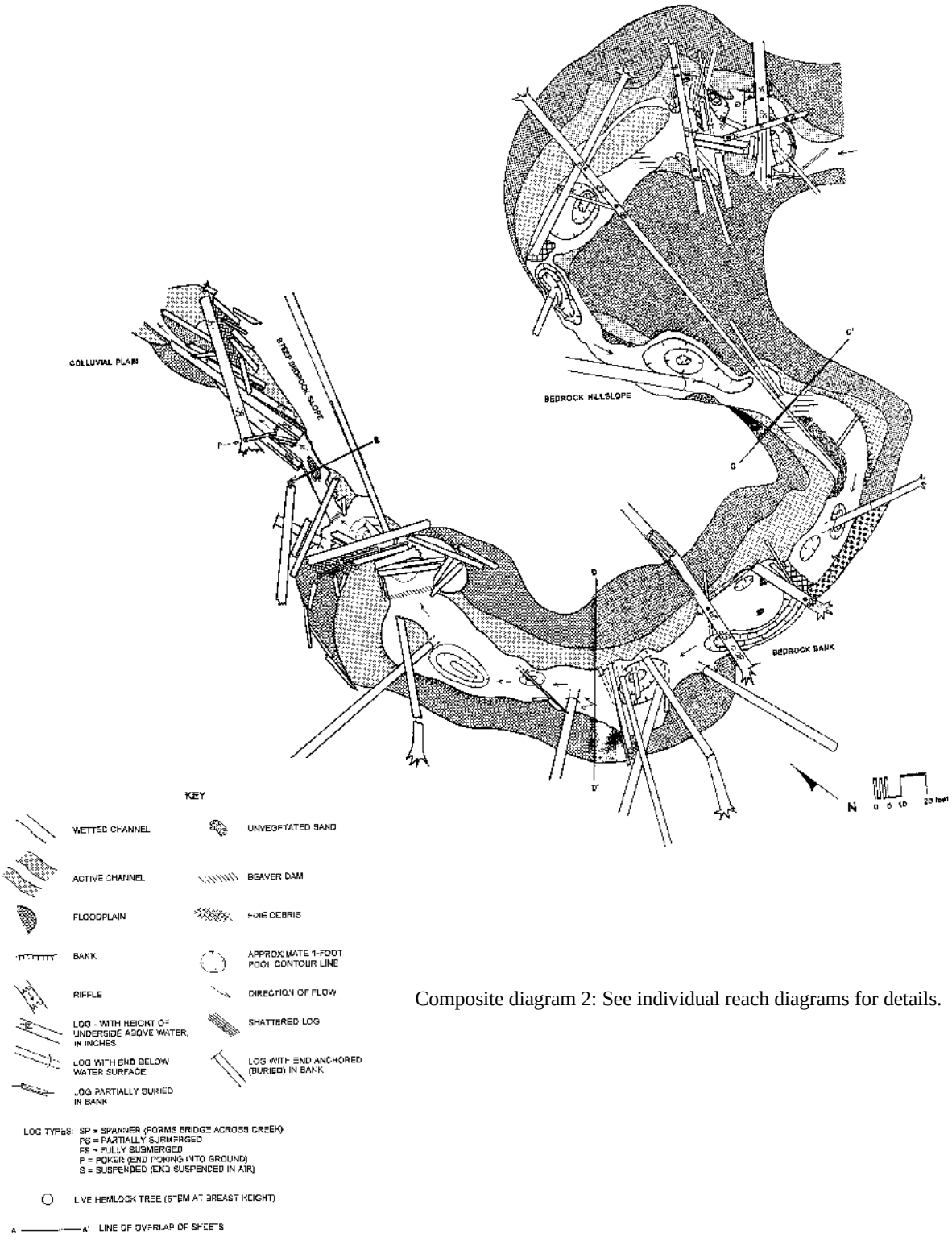
A total of 14.5 days were spent completing this project, as follows:

- 5 days - collecting information from which diagrams were produced and taking photos from the ground
- 3 days - taking balloon-cam photos
- 6.5 days - producing diagrams, organizing and mounting photos, documenting project.

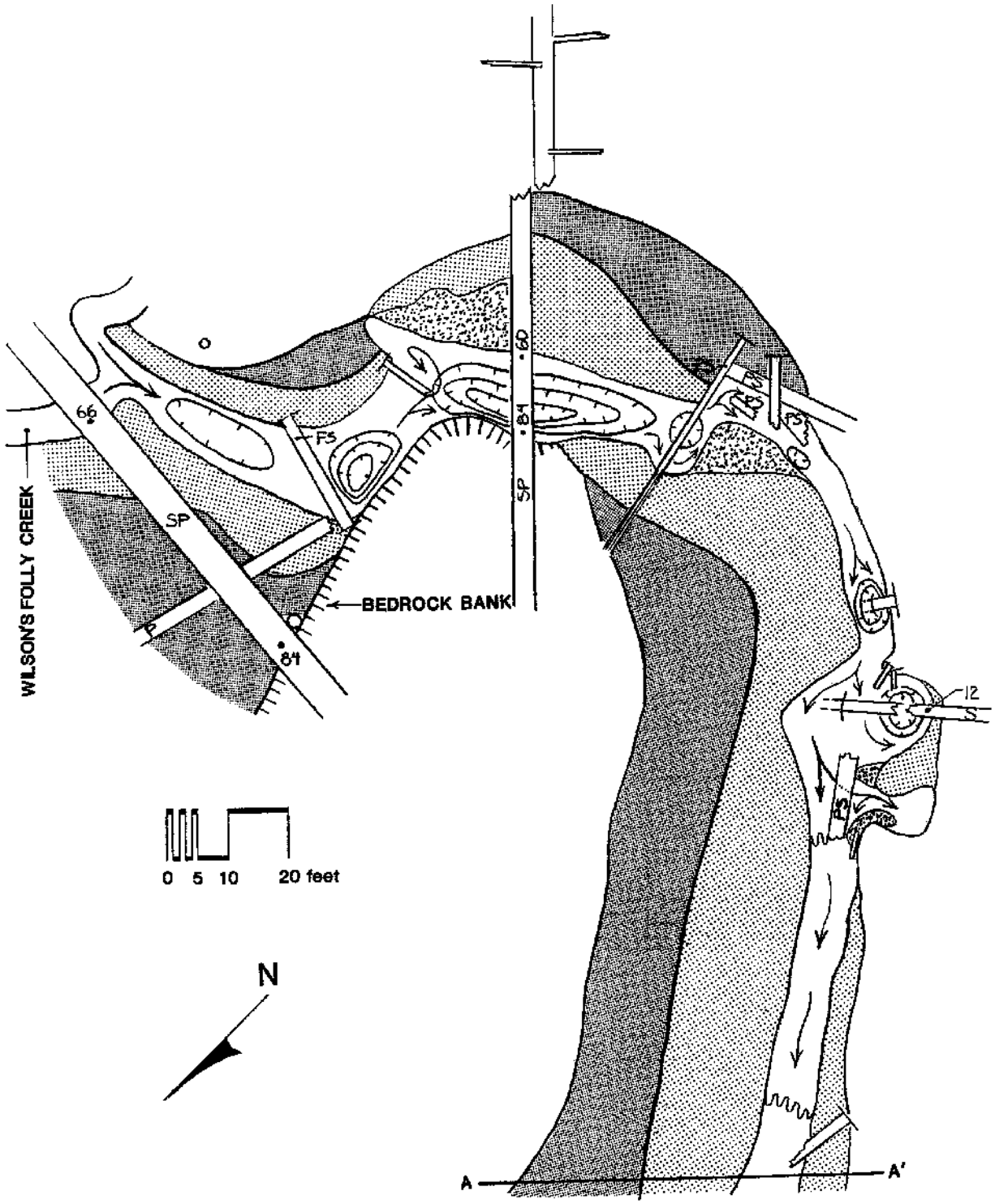
If a similar were project were done now, we could probably complete it in about 9 or 10 days, assuming we had good weather: Four days collecting field notes and taking photos instead of 5; One day taking the balloon-cam photos instead of 3; and 4-5 days producing diagrams, mounting photos, and documenting the project instead of 6.5.

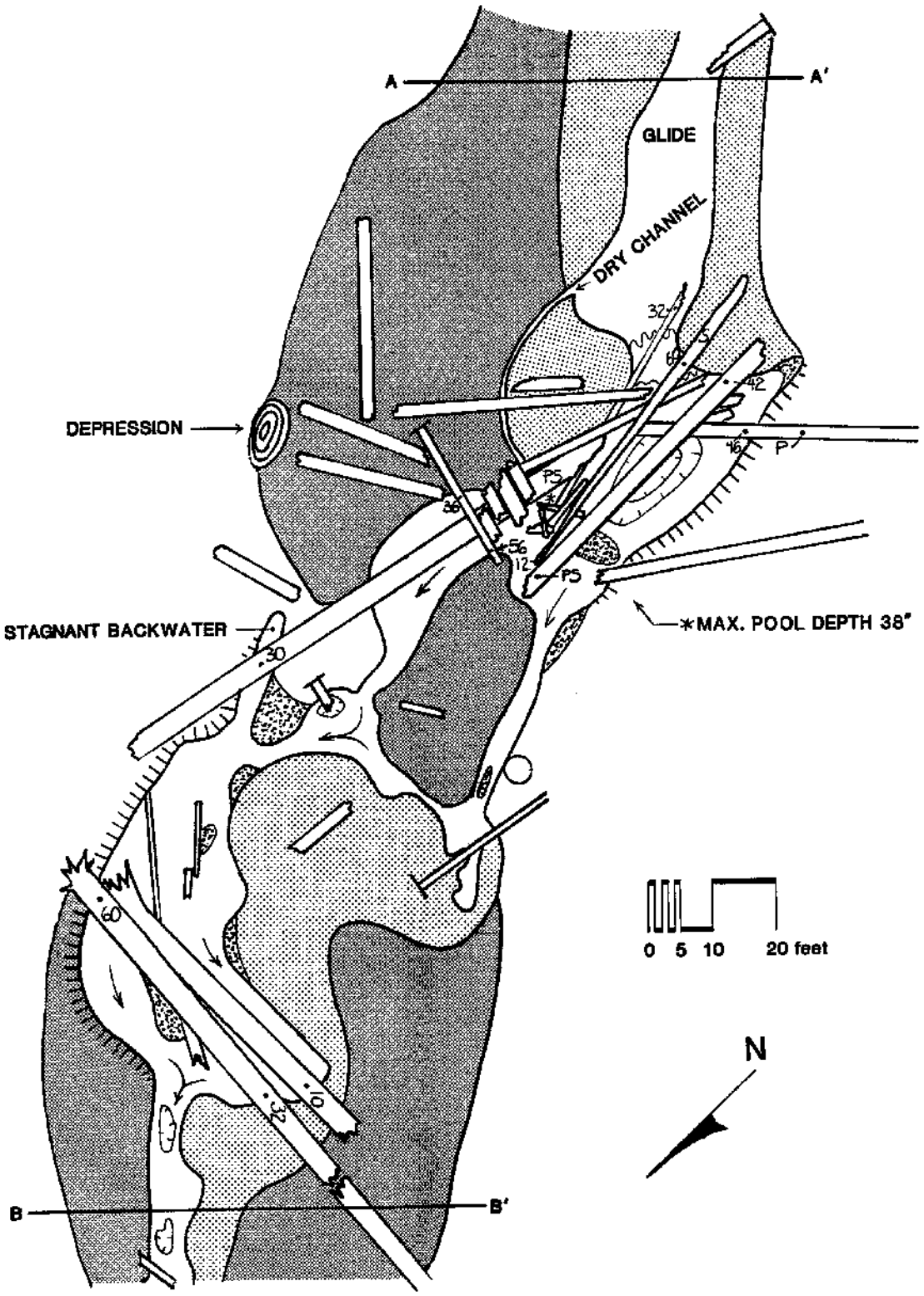


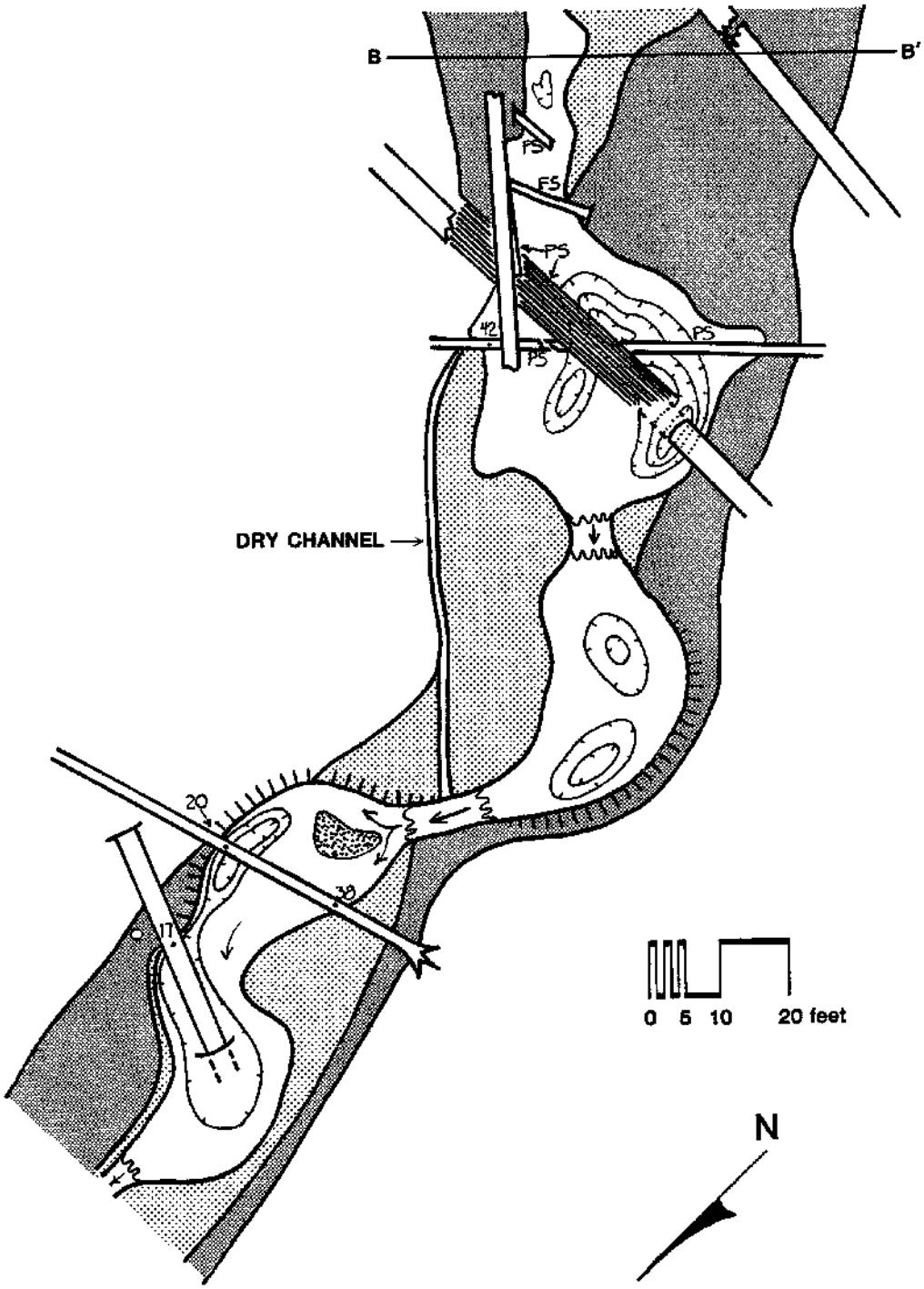
Composite diagram 1: See individual reach diagrams for details.

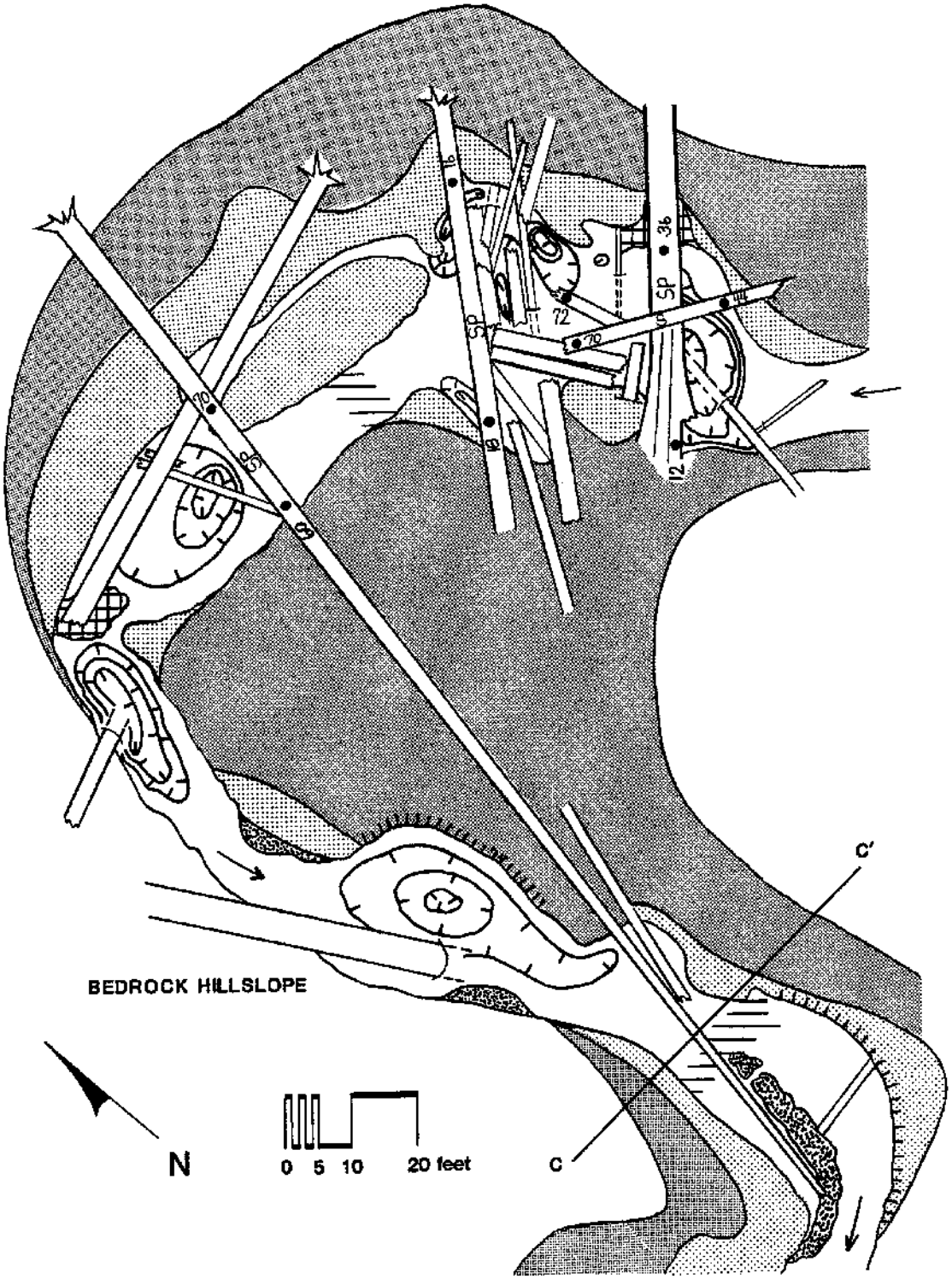


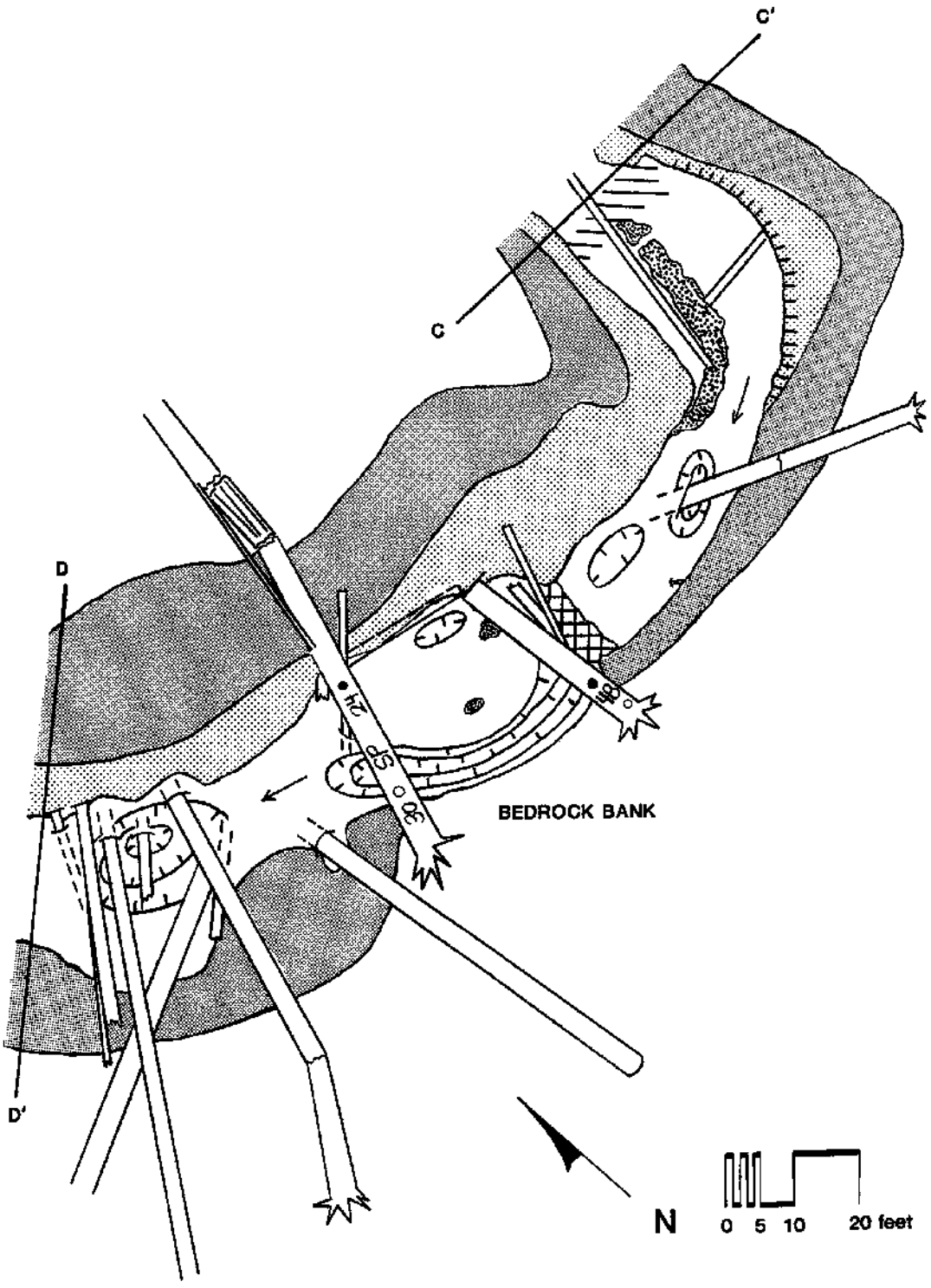
Composite diagram 2: See individual reach diagrams for details.

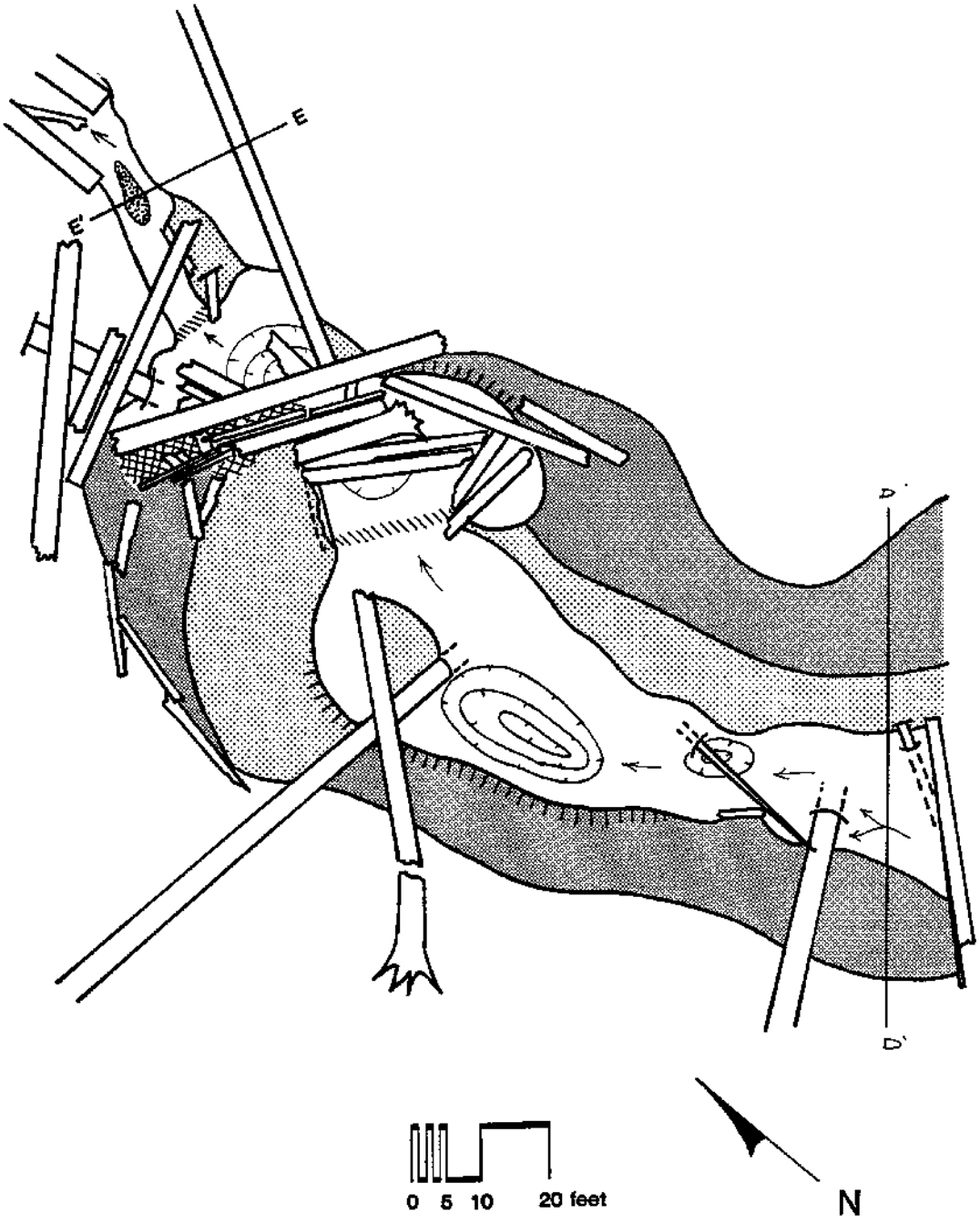

WILSON'S FOLLY CREEK
66
FS
SP
BEDROCK BANK
84
60
84
SP
FS
FS
12
FS
0 5 10 20 feet
N
A
A'

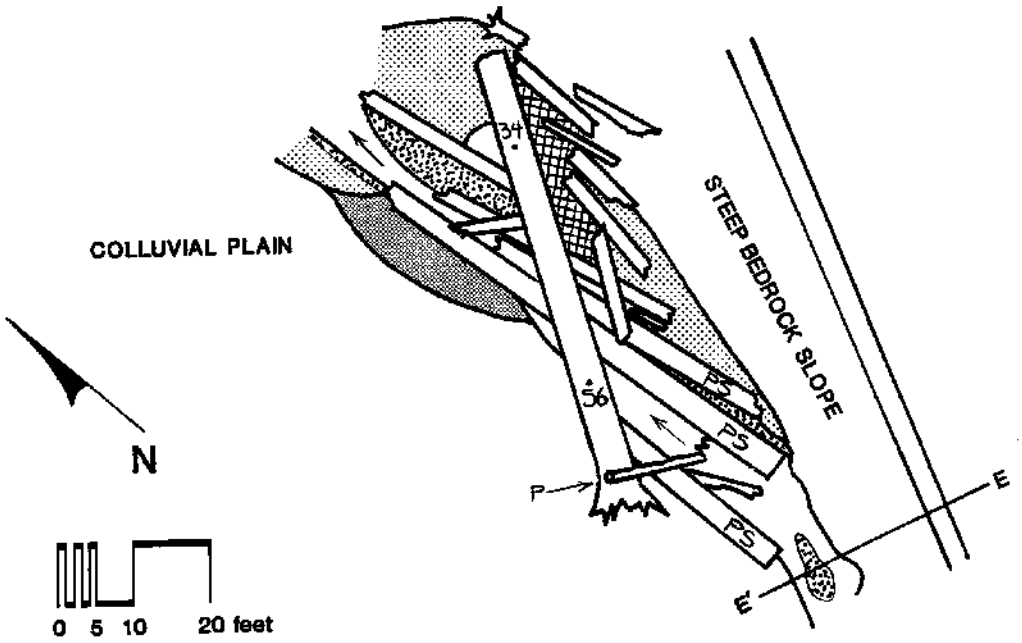

A
A'
GLIDE
DRY CHANNEL
32
60
42
DEPRESSION
16
P
PS
36
56
12
PS
STAGNANT BACKWATER
30
*MAX. POOL DEPTH 38"
60
0 5 10 20 feet
N
10
32
B
B'


B
B'
FS
FS
FS
42
FS
FS
DRY CHANNEL
20
30
17
0 5 10 20 feet
N


BEDROCK HILLSLOPE
N
0 5 10 20 feet
C
C'
Sp
36
72
20
12
10
8
5


C'
C
D
D'
BEDROCK BANK
N
0 5 10
20 feet


E
E'
D
D'
0 5 10 20 feet
N


COLLUVIAL PLAIN
N
0 5 10 20 feet
34
56
STEEP BEDROCK SLOPE
PS
PS
P
PS
E
W