A photograph of a soldier in a desert landscape. The soldier is wearing a helmet and a jacket, and is kneeling on the ground, looking out over a vast, arid plain. The background shows a flat, open desert with some distant hills under a clear sky. The text is overlaid on the right side of the image.

**A multi-scale approach to  
understanding desert  
piedmonts using  
cosmogenic isotopes and  
centimeter-scale surveying**

**Kyle Nichols**  
**Department of Geology**



# Approach

	<i>Short-term (50 yrs.) maps</i>	<i>Long-term (<math>10^3</math> to <math>10^4</math> yrs.) isotopes</i>
<i>Small-scale (m)</i>	<b>1</b>	<b>2</b>
<i>Large-scale (km)</i>	<b>N/A</b>	<b>3</b>





**Global Positioning Systems  
(GPS; left)**

**Accelerator Mass  
Spectrometry (AMS; top)**





A



# Desert Training Center 1942 to 1944

- Over 1,000,000 men
- 12 base camps
- Size of Vermont









# Why use Iron Mountain?

- 2 years channel alteration (Army tanks, marching soldiers, etc.)
- No significant disturbance since
- Discrete time-frame of channel response to intense use (1944 to present).
- Ability to survey channels on the centimeter scale using differential Global Positioning System.

# **Centimeter-scale topographic mapping**

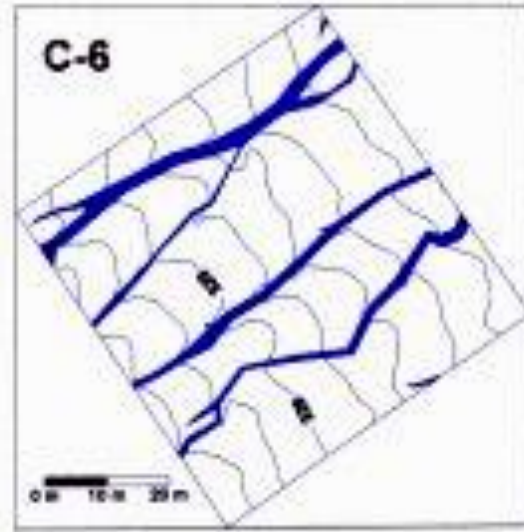
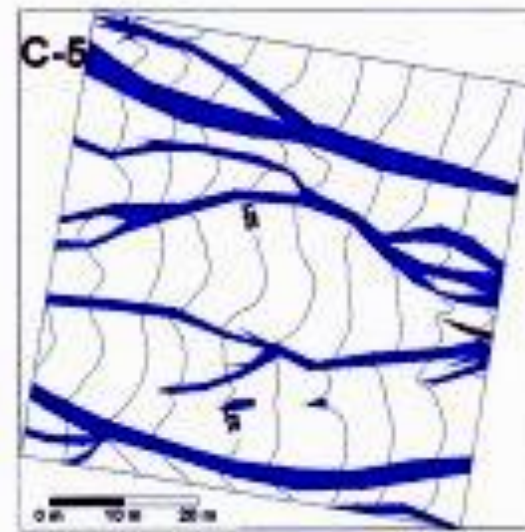
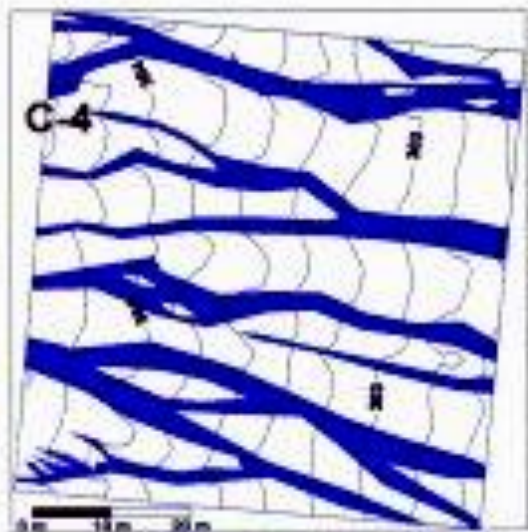
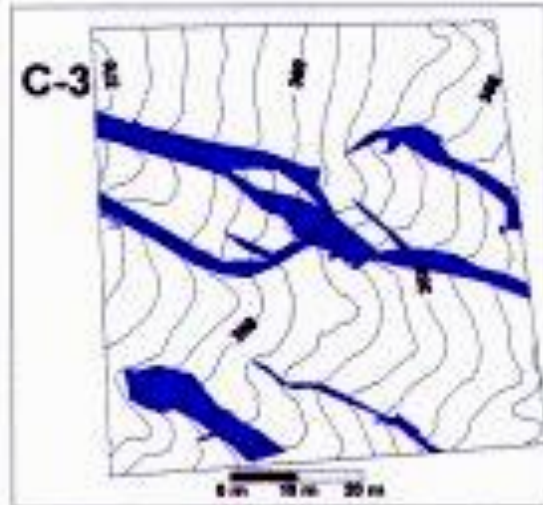
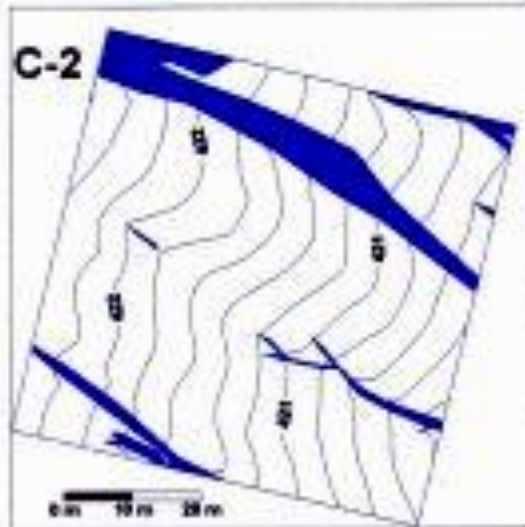
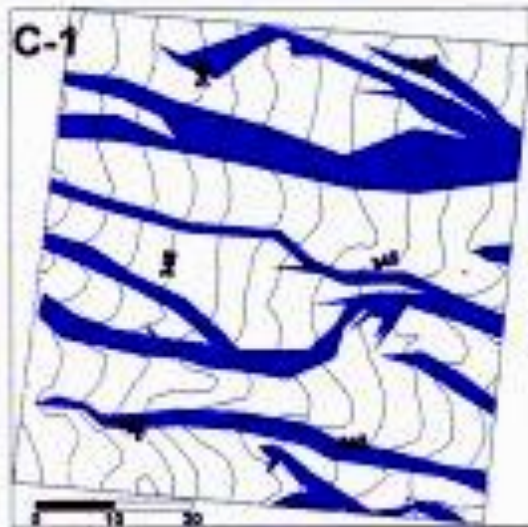
- **6 Control Plots - representative of piedmont channels outside of Camp Iron Mountain**
- **6 Walkway Plots - representative of piedmont channels forming in areas of intense foot trafficked areas**
- **6 Road Plots - representative of piedmont channels forming down-gradient of road berms**



# Control Area



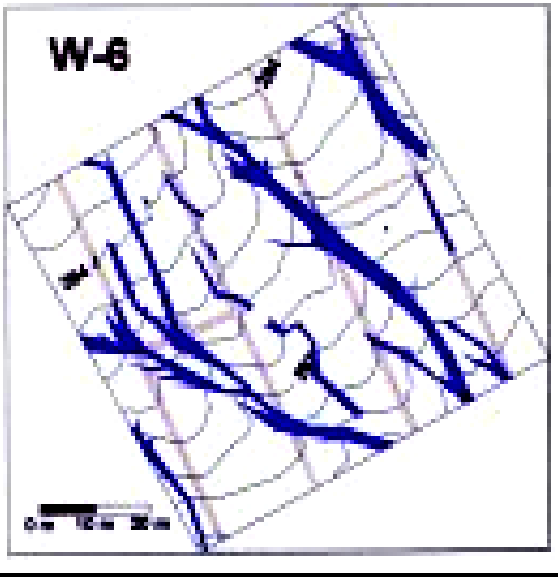
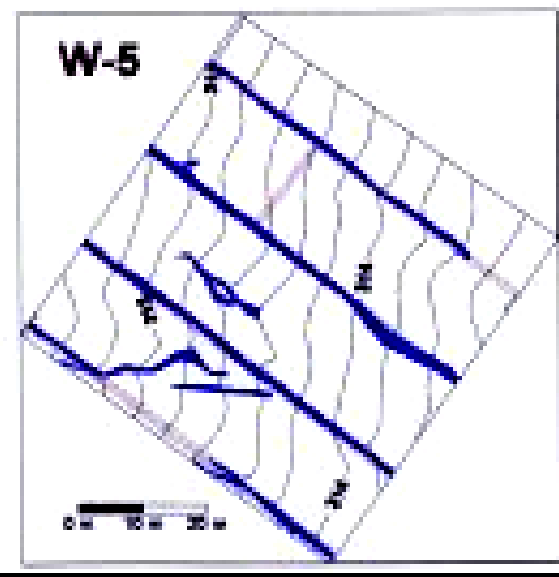
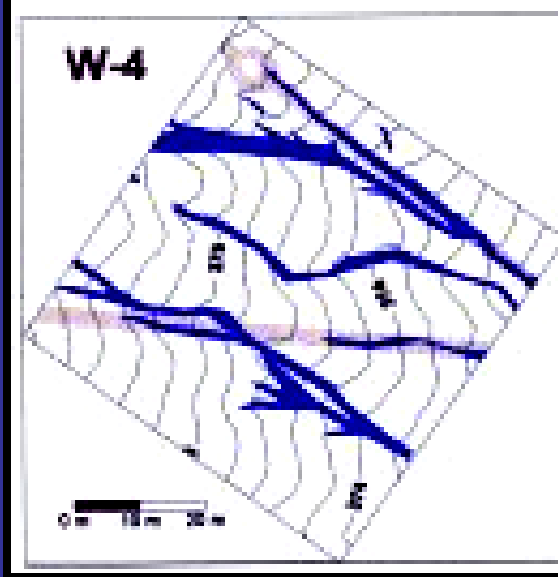
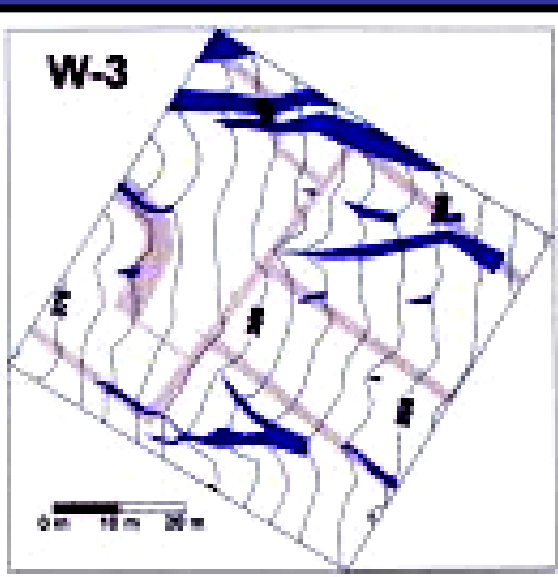
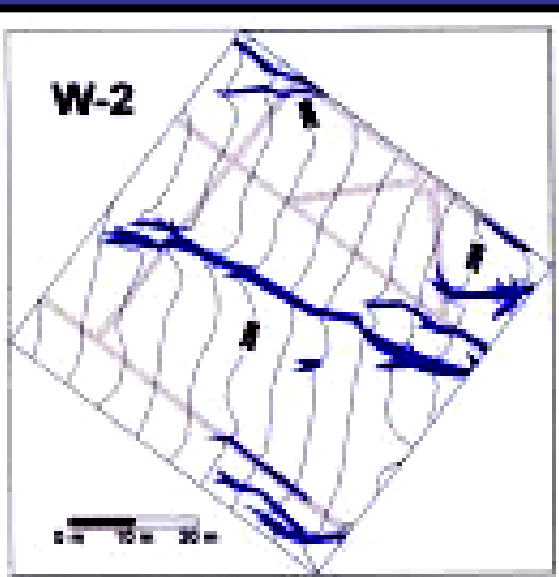
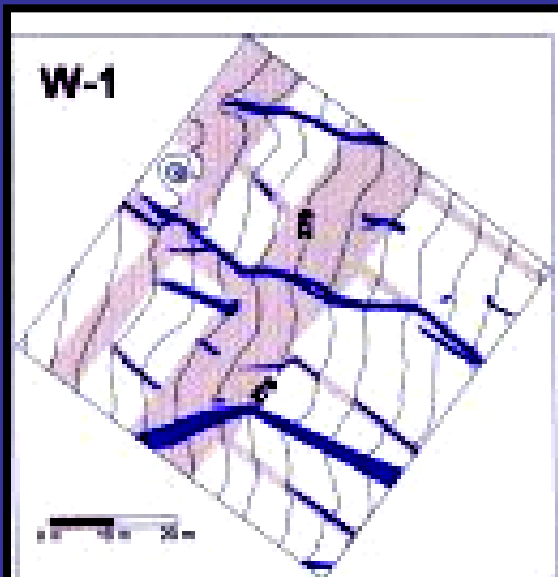




# Typical Walkway Area

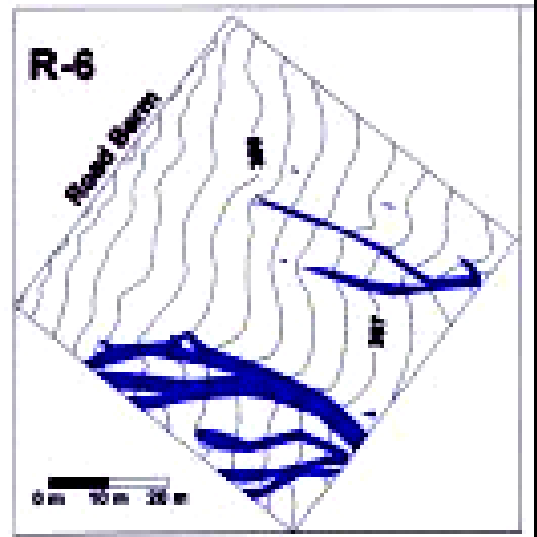
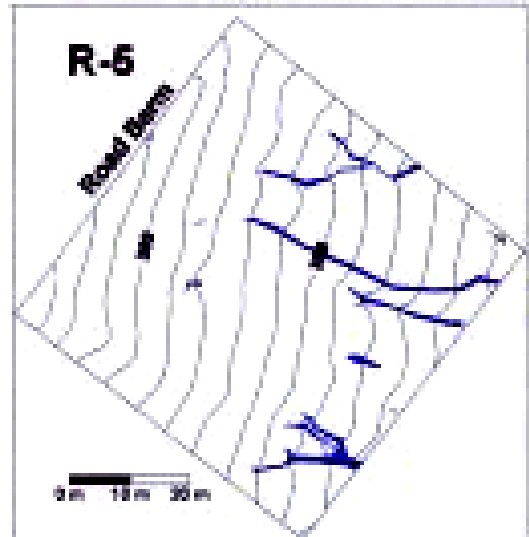
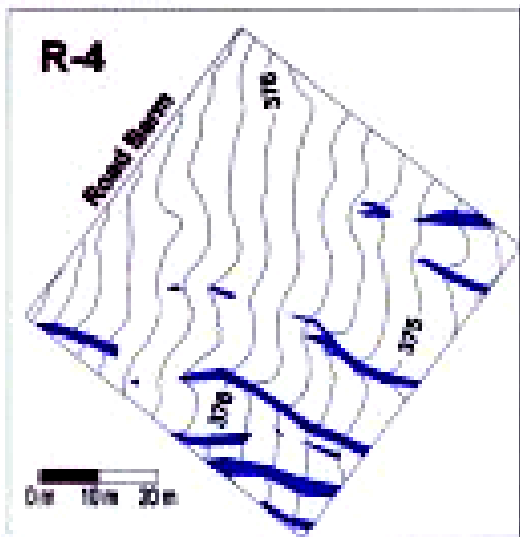
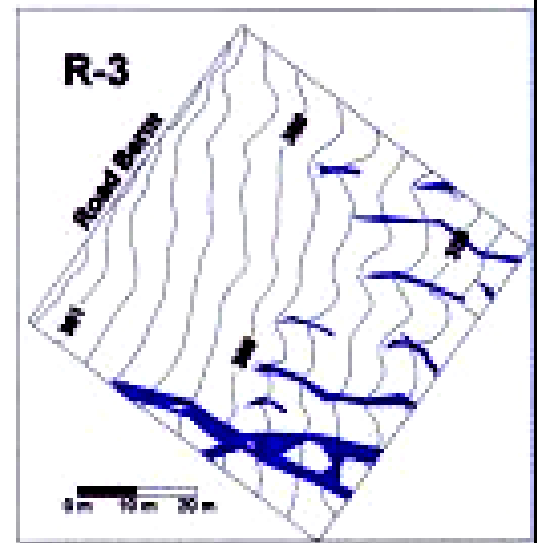
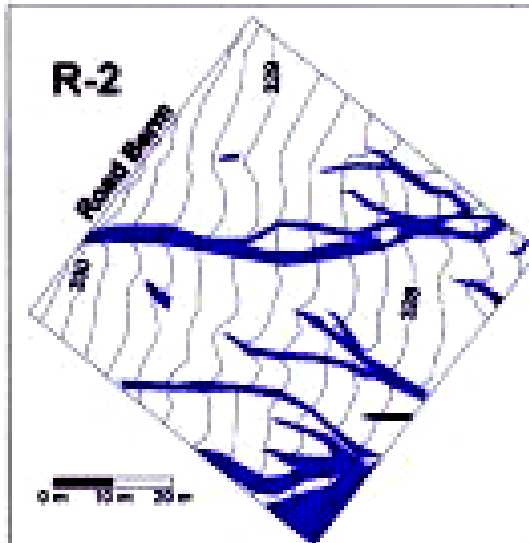
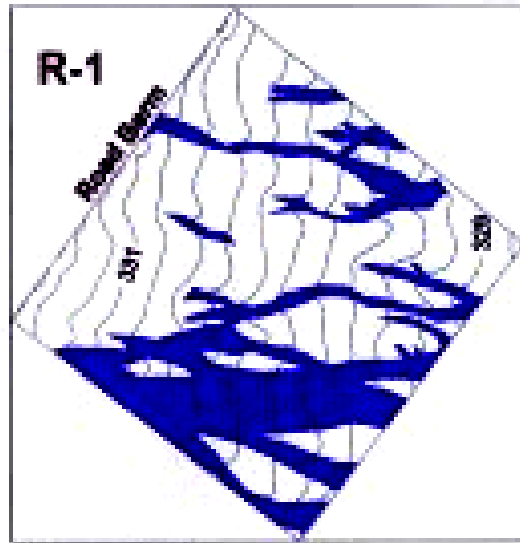




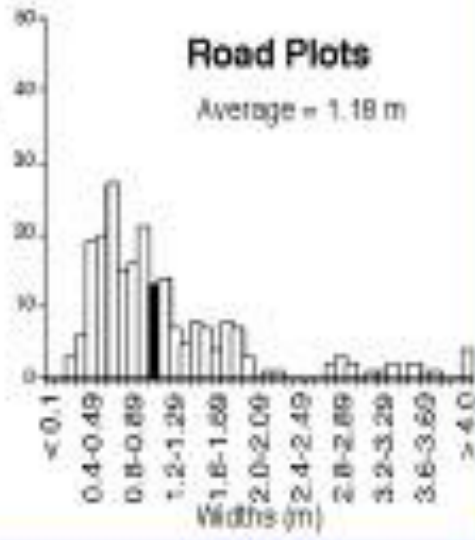
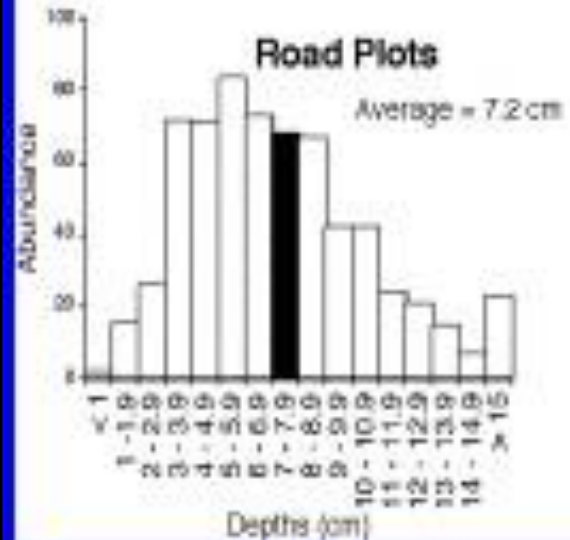
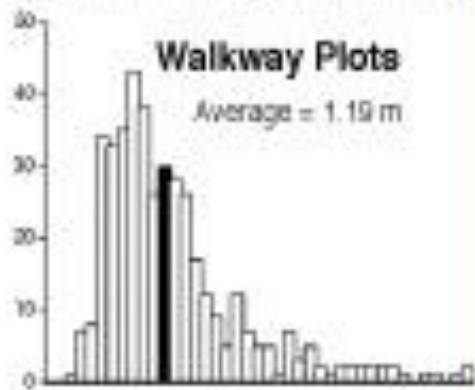
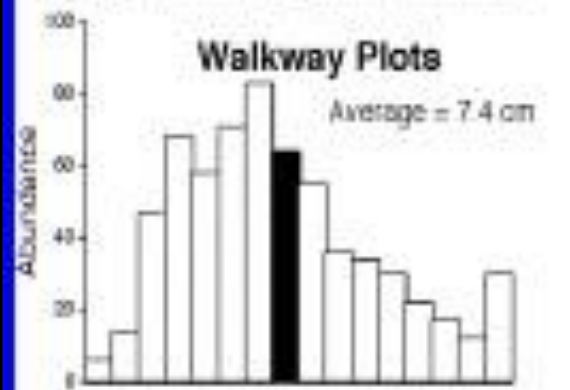
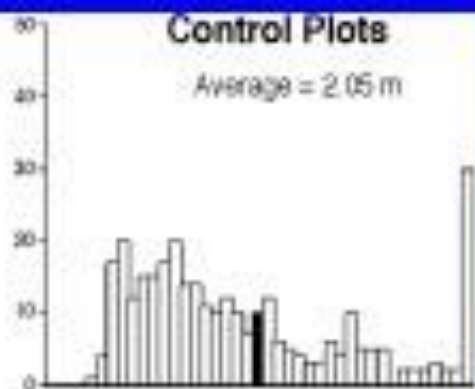
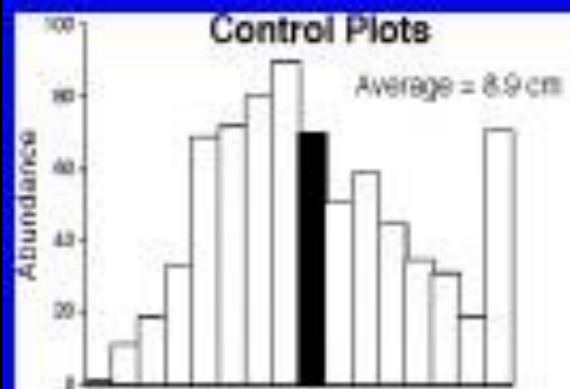


# Typical Road Area

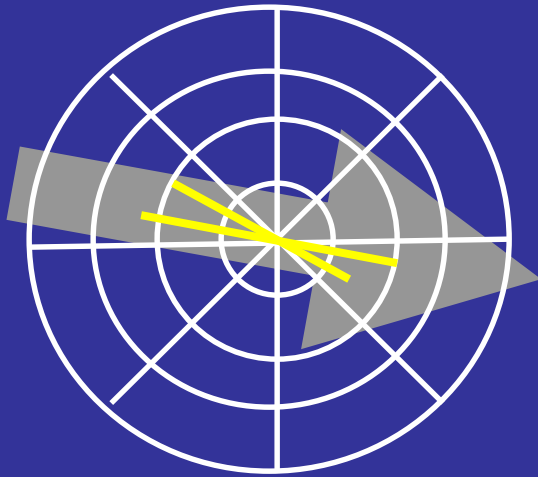




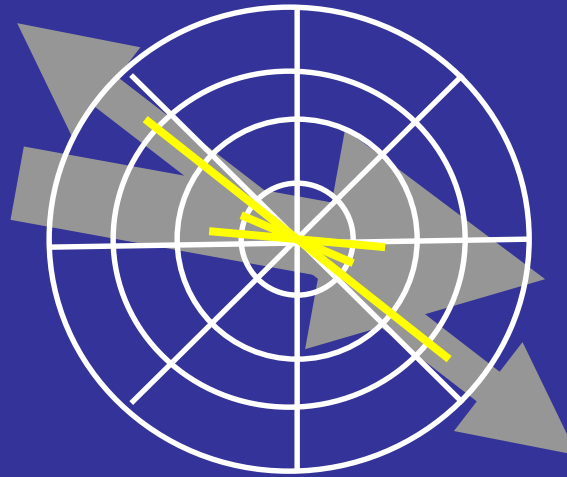




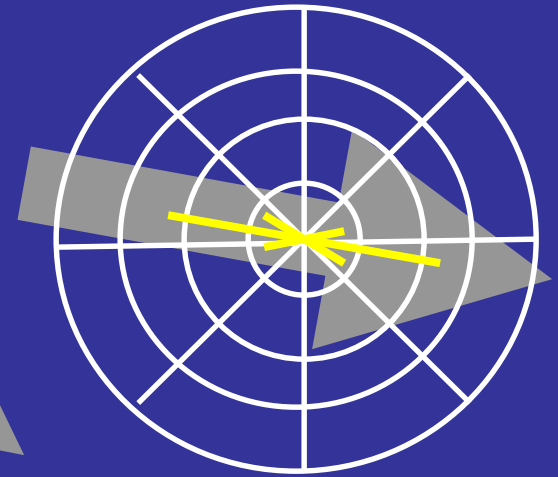
# Channel orientations



**Control Plots**



**Walkway Plots**



**Road Plots**