



# Getting Off The Ground In Cross-Country Soaring

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It's difficult to have a successful, fun cross-country experience without some planning and preparation beforehand.

There are a few necessary requirements you must consider before your flight, and some things to be aware of on the day you actually go.



## **PRE-TRIP REQUIREMENTS**

1. FAR's require that you familiarize yourself with (among other things):
  - A. Weather
  - B. Aircraft performance
  - C. Airports and alternates
2. Cypress Club rules require:
  - A. Private pilot rating
  - B. Simulated off-field landing, checkout on aircraft assembly and trailer rigging, cross-country endorsement by club CFI
  - C. 25 hours total time, including 10 hours and 10 landings in the aircraft used
  - D. Four 1 hour flights, one flight greater than 2 hours
  - E. 5 flights in the past 90 days
  - F. Flights over 12,500 ft. msl:
    1. FAA physiological training or Cypress Club high altitude training
    2. Ground checkout on oxygen system
3. Review aircraft glide performance, speeds to fly, routes, landing sites, etc.
  - A. You must fly efficiently for the conditions of the day
  - B. Be able to estimate your glide ratio and go-ahead points
4. Observe whether patterns for a few days prior to the day you fly
5. Study your sectional chart and roadmap
  - A. Plot course, mark in 5 mile increments
  - B. Note alternate landing sites– try to keep within 5-10 mile distances. Note hostile terrain, MOAs and restricted areas
  - C. Note field elevations and pattern altitudes of airports
  - D. At airports, note standard landing pattern direction and CTAF radio frequency
  - E. Note obstacles along your course line– e.g., high terrain, radio towers, etc.
  - F. Study a roadmap of the area. Get familiar with roads, highways, landmarks
6. Enter waypoints into your GPS including alternate landing sites and other relevant information– radio frequencies, field elevations, etc.
  - A. Be completely familiar with the operation of your GPS
  - B. Install fresh batteries and keep a spare set of batteries for backup

## **AIRCRAFT & TRAILER PREPARATION**

Have your crew do as much of the work as possible so you do not become fatigued

1. Make sure trailer tires & spare tire are in good condition & properly inflated
2. Make sure electrical hookups are working properly
3. Make sure crew has tow-out equipment, at least 30 ft. of tow rope, tiedowns, and all equipment secured in trailer
4. Glider– assemble and complete a careful preflight. Crew to check pilot's work and do positive control check– tape wing roots
5. Install battery
6. Oxygen– put fresh battery in regulator and install. Turn on oxygen at tank and do PRICE preflight check
7. Install flight recorder, barograph, GPS (may require Official Observer)
  - A. Put in charts & maps
8. Put in water, food, emergency kit, pee bags or other relief system
9. Preflight parachute and put in cockpit
10. Do a radio check with the crew vehicle and glider

## **PILOT PREPARATION**

1. Get plenty of rest the night before you fly
2. Eat light, but don't make unusual changes to your diet
3. Drink water and/or a sports drink like Gatorade or Propel. Stay hydrated from before you get in the cockpit until after you land. Drink water 20 minutes before landing
  - A. If you stay hydrated, you'll need to pee. Bring ziplock bags or use the glider relief tube if available. Some pilots use catheters or bags with absorbent gels
4. Wear light clothing that covers your arms. Wear a soft hat, preferably one that covers your ears and neck
5. Use sunscreen– sports types are best
6. Wear sunglasses

7. Stay in shade as much as possible before flight. Keep cool. Use a wet towel draped over your head to cool off before flight
8. In flight take some high energy, non-melting snacks
9. Go on oxygen at 10,000 ft. msl. Go on oxygen 20 minutes before landing especially if you have been flying at high altitudes throughout the flight and are tired
10. Get in good physical condition before your planned cross-country trips. Exercise. Build your stamina– you'll need it in the harsh desert and high mountain environments

## **CREW PREPARATION**

1. Try to pick a crew with at least one experienced glider pilot
2. If you are flying for a badge, you will need an Official Observer
3. The crew will need a duplicate set of maps and charts, GPS waypoints
4. Establish procedures for radio communications
5. List cell phone numbers for contact
6. Brief crew on your plans

## **CREW RESOURCE MANAGEMENT**

1. Have your crew do as much work for you as possible on the morning before you fly
  - A. Rest, drink water, prepare mentally
2. Have the trailer hooked up to your crew vehicle, ready to go
3. Establish radio communications as soon as you are off tow
  - A. Example, announce "two echo charlie off tow"
  - B. Report to your crew about every 20-30 minutes
    1. Example, "Four foxtrot ground, four foxtrot– 2 miles south of Silverlake, climbing through niner thousand, proceed to Calico"– crew should repeat instructions
    2. If you don't call them, they should call you
4. Once established in lift and you anticipate reaching your go-ahead altitude, send the crew out ahead of you. You will usually be able to outrun them. Some pilots have their crew wait in the bar in town while they fly. We prefer to have the crew follow along with the pilot
  - A. Send them to the next waypoint and have them wait there for you

- B. Send them ahead when you know you can also proceed
  - C. Ask them to return to your last location if you cannot go ahead
5. If possible, have your crew arrive at your landing site before you
- A. Crew can give you information about terrain, wind, obstructions, etc.
6. Rely on your crew to give you navigation advice, wind conditions on the ground, calculate distances, etc. Have them share your workload
- A. Crew can take notes with time of radio calls, location, altitude, intentions
7. Buy them dinner at the end of the day!

## **FLIGHT PROFILE**

The theory of the flight profile can be applied to small steps in a long distance flight. It's much easier to deal with a long distance by breaking it up into smaller steps, all of which make up the total flight. The important points to remember about the flight profile are:

1. If you don't have enough altitude to reach your next goal, go back to your last safe landing site
  - A. Look for any lift along the way
2. Allow for degraded performance because of headwind, sink, poor flying
  - A. You might estimate 3, 4 or 5 miles per thousand feet of altitude as a general rule of thumb in determining weather you can go ahead to your next goal, or not
3. Never go forward without a known safe landing site within gliding distance

To prepare a flight profile, you will use several items:

1. A Sectional chart
  2. A plotter
  3. Graph paper
  4. Aircraft glide polar
1. Plot a course line
- A. Find the latitude, longitude and field elevation of each airport
  - B. Add 1,000 ft. to each airport elevation for a proper landing pattern
  - C. Find the total distance, true course and magnetic course

2. Make note of any landing fields or airports along the way
3. Estimate winds aloft– add 1/2 the wind speed to the best L/D speed
  - A. This is your speed to fly in headwind
  - B. Fly a speed between minimum sink and best L/D speed for tailwind
5. Determine your best glide angle, taking into account the headwind or tailwind, performance at your chosen airspeed, plus a reduction for sink and other degradation to the L/D– multiply your adjusted glide angle by 70% as a safety factor
6. Plot these glide angles on the graph paper
  - A. The distance on course where the angles intersect is the point at which, given the conditions, you can go forward or return and have enough altitude to make your destination.
  - B. Make note of any obstructions such as mountain peaks along the course line
    1. In your flight profile, make sure to allow 1,500 ft. vertical clearance with a headwind and 500 ft. vertical clearance with a tailwind.

You probably won't bring a flight profile with you in the cockpit. However, using the profile to get some basic "rule-of-thumb" information will help you to more easily make inflight go or no-go decisions, especially if you are not flying with a GPS, or your trusty technological device has failed you

# FLIGHT PROFILE

AIRCRAFT: \_\_\_\_\_ DEPARTURE: \_\_\_\_\_ FIELD ELEV. \_\_\_\_\_ PATTERN ALT. \_\_\_\_\_ MSL  
 1. BEST L/D: \_\_\_\_\_/1 @ \_\_\_\_\_ KTS. DESTINATION: \_\_\_\_\_ FIELD ELEV. \_\_\_\_\_ PATTERN ALT. \_\_\_\_\_ MSL  
 PLUS 1/2 WINDSPEED: \_\_\_\_\_ KTS.  
 = SPEED TO FLY: \_\_\_\_\_ KTS.  
 2. L/D @ \_\_\_\_\_ KTS. = \_\_\_\_\_/1  
 (wind adjusted glide ratio)

For pattern altitude, add 1,000 ft. to field elevation.  
 OBSTACLE CLEARANCE: • 1,500 ft. with headwind  
 • 500 ft. with tailwind

**GLIDE RATIO WITH HEADWIND:**

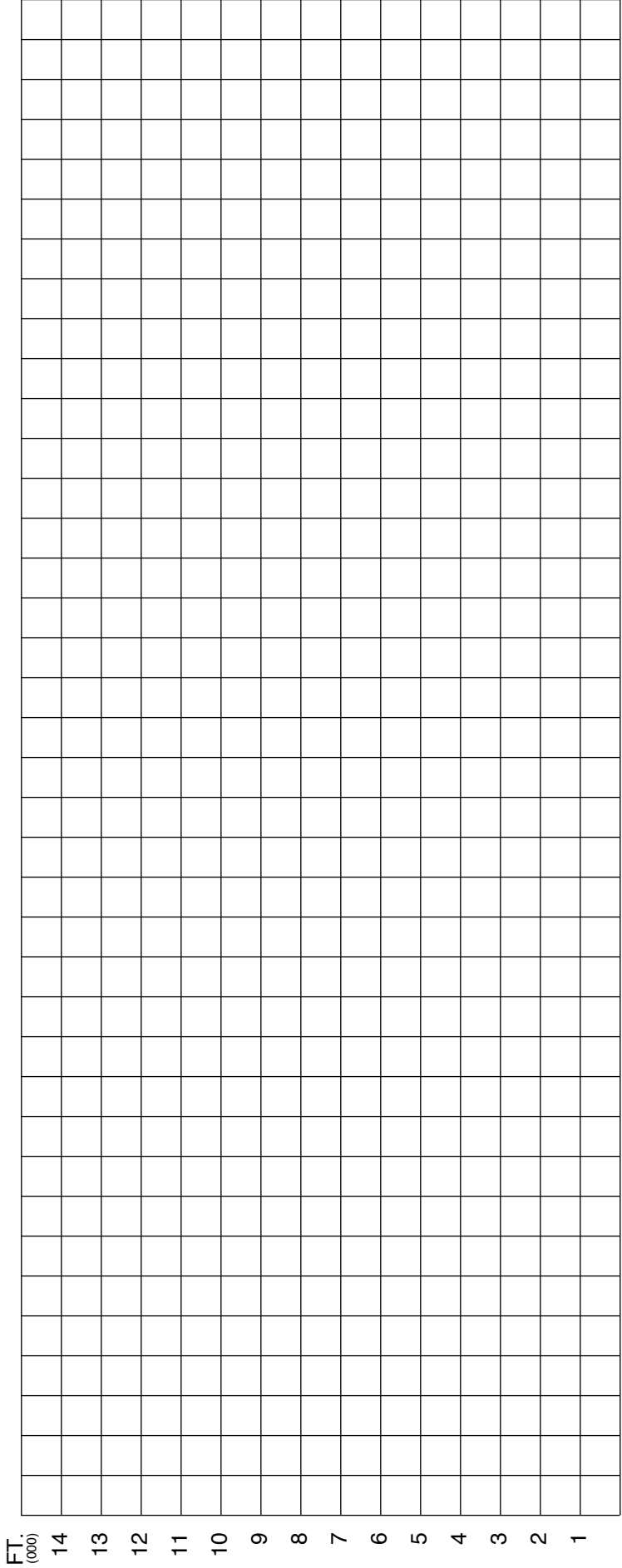
Formula:  $\frac{\text{Speed to fly} - \text{wind}}{\text{Speed to fly}}$  X wind adjusted glide ratio X .7 = Adjusted glide angle

Formula: (     -     ) = \_\_\_\_\_% X \_\_\_\_\_ = \_\_\_\_\_ X .7 = \_\_\_\_\_/1

**GLIDE RATIO WITH TAILWIND:**

Formula:  $\frac{\text{Best L/D speed} + \text{wind}}{\text{Best L/D speed}}$  X best L/D glide ratio X .7 = Adjusted glide angle

Formula: (     +     ) = \_\_\_\_\_% X \_\_\_\_\_ = \_\_\_\_\_ X .7 = \_\_\_\_\_/1



MI. 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76

# FLIGHT PROFILE EXAMPLE

Las Vegas Sectional

Departure: Jean, NV 115° 20' w, 35° 46' 30" n 2832 ft. elev.

Destination: Shoshone, NV 116° 16' w, 35° 58' 30" n 1568 ft. elev.

Distance: 47 NM

True course: 285°

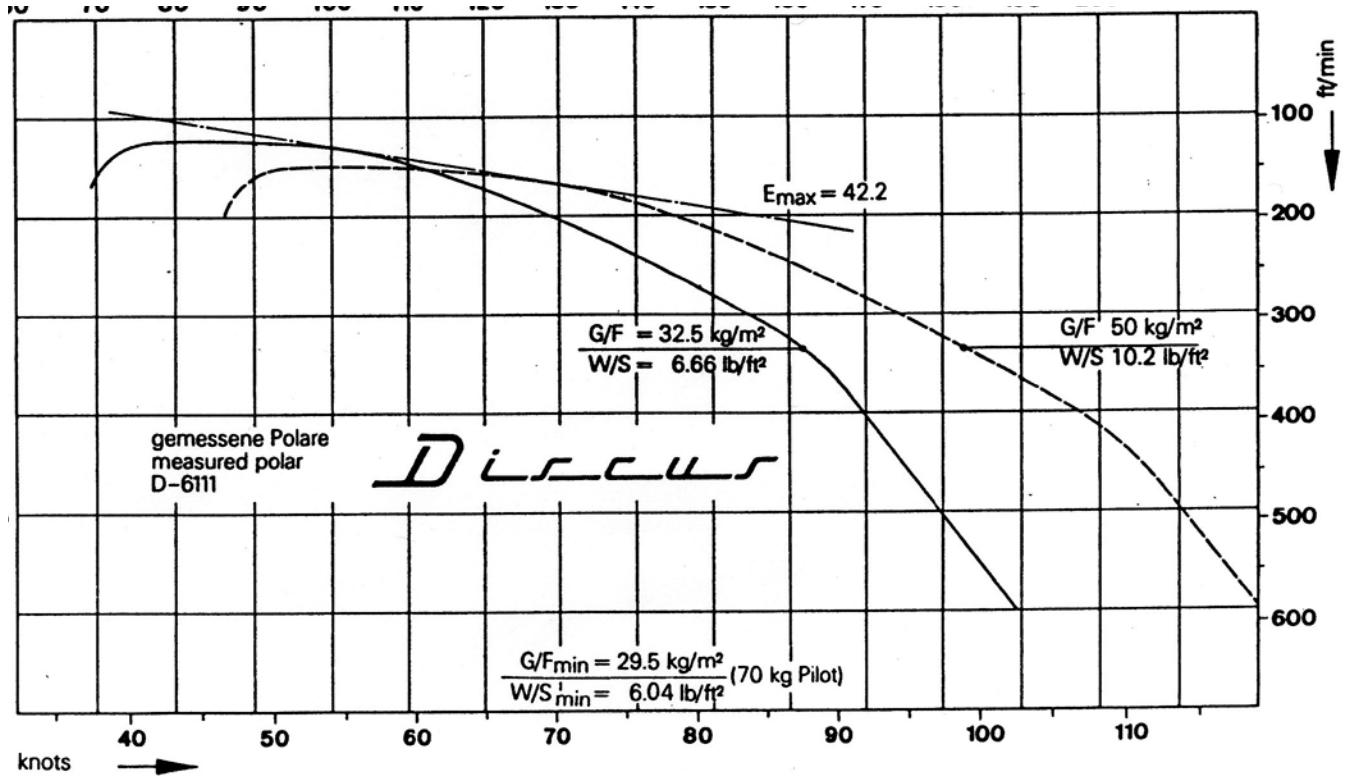
Magnetic heading: 271°

Wind: 270° @ 16 kts.

Obstacle at 10 mi. from Shoshone at 4900 ft.

Obstacle at 7.5 mi. from Jean at 5152 ft.

Aircraft: Discus B 42:1 max. L/D @ 54 kts.





# FLIGHT PROFILE

AIRCRAFT: **Discus**  
 1. BEST L/D: **42** /1 @ **54** KTS.  
 PLUS 1/2 WINDSPEED: **8** KTS.  
 = SPEED TO FLY: **62** KTS.  
 2. L/D @ **62** S. = **38** /1  
 (wind adjusted glide ratio)

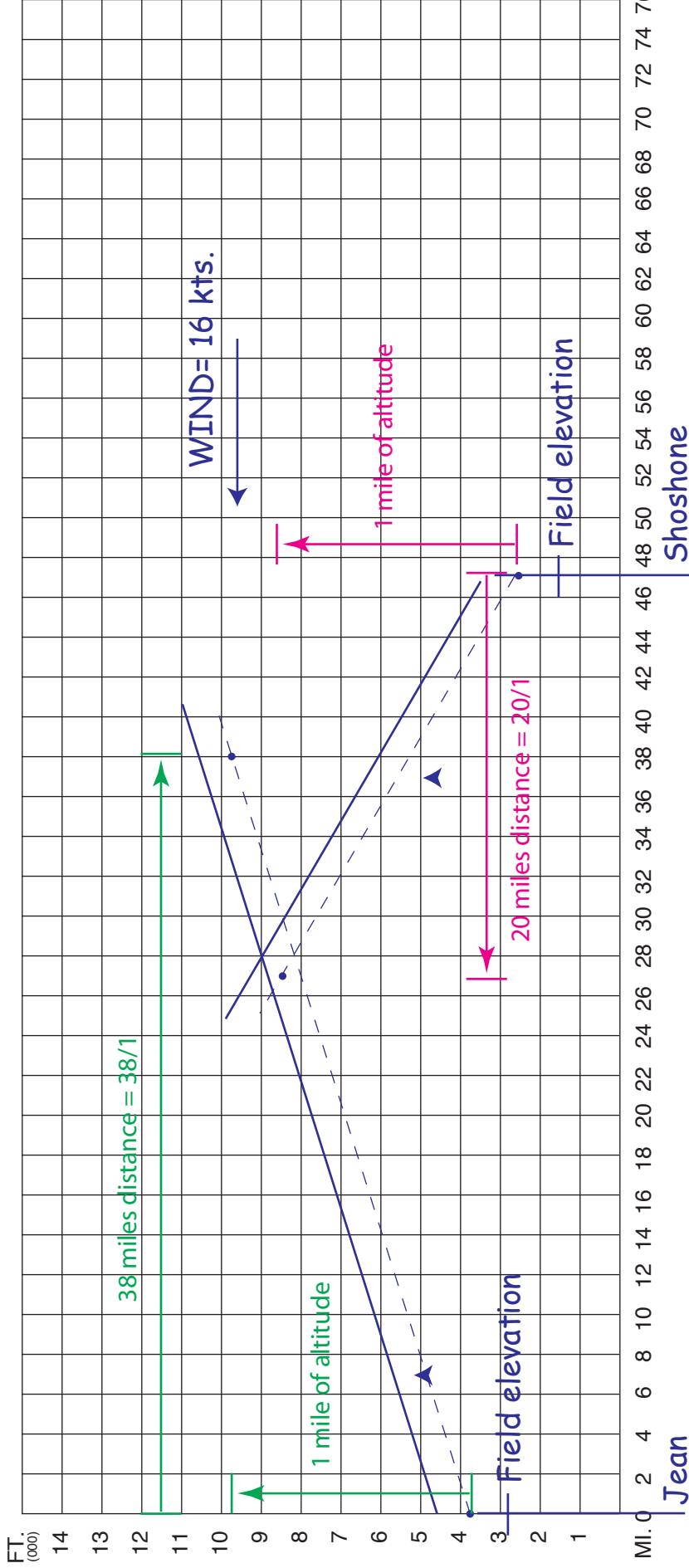
DEPARTURE: **Jean, NV**  
 DESTINATION: **Shoshone, NV**  
 DISTANCE: **47 nm** MI.  
 WIND: **270** ° @ **16** KTS.

FIELD ELEV. **2832** PATTERN ALT. **3800** MSL  
 FIELD ELEV. **1568** PATTERN ALT. **2600** MSL

For pattern altitude, add 1,000 ft. to field elevation.  
 OBSTACLE CLEARANCE: • 1,500 ft. with headwind  
 • 500 ft. with tailwind

GLIDE RATIO WITH HEADWIND:  
 Formula: (Speed to fly - wind) X wind adjusted glide ratio X .7 = Adjusted glide angle  
 Speed to fly  
 Formula: ( **62 - 16** ) **75** % X **38** **28.5** = **20** X .7 = **14** /1  
**62**

GLIDE RATIO WITH TAILWIND:  
 Formula: (Best L/D speed + wind) X best L/D glide ratio X .7 = Adjusted glide angle  
 Best L/D speed  
 Formula: ( **54 + 16** ) **130** % X **42** **54.6** = **38** X .7 = **27** /1  
**54**



## **IN-FLIGHT STRATEGIES**

1. Get high and stay high
  - A. Fly in the strongest band of lift, however not always climbing to the top of lift
2. The longer the flight distance, the more time becomes critical
  - A. Fly faster between thermals
    1. One technique is to fly the down vario reading in cruise, equal to the up vario reading in lift
3. On weak days, use all available lift and fly at best L/D speed or best speed-to-fly
4. On strong days, use the strongest lift and porpoise through the weaker lift
5. When communicating with other aircraft, always state that you are a glider and give the full N number on initial contact
6. If you lose communications with your crew, return and land at the last known landing site. Your crew should rendezvous there. If your last communication established that you are going forward to the next landing site, go there and land. Your crew should also proceed to that site. You could "go it alone", but that increases risk, both to your person and to club equipment in the event you must land out

## **OFF-FIELD LANDINGS**

1. Start selecting potential landing fields at 3,000 ft. agl.
2. By 2,000 ft. agl, narrow your choice to one field
  - A. Circle the field to inspect and prepare for a landing pattern
3. By 1,000 ft. agl, begin your landing pattern
4. Avoid landing on roads. Many have burms, mile markers, posts, wires
5. Dry lakebeds are often suitable, but sometimes have gullies, and may be inaccessible by car. Some can be soft and wet underneath a dry crust
6. Plowed fields are often suitable, but watch for sprinklers and pipes. Watch for wires
7. Pastures can be rough and have rocks but may be landable
8. Cultivated fields will have sprinklers and crops— mowed alfalfa fields are generally good
9. Open desert— creosote bushes and Joshua trees are rigid. Use only as a last resort