I. Preparing the soil

A. Subsoiling
When soil is compacted, or when there is a heavy subsoil.
Single shank, at least 18 inches deep.
Wait at least 6 weeks before planting.
Plant 6 inches off of subsoiled row.

B. Bedding
Controversial
Improves aeration on wet sites.
May improve conditions for root growth.
Can lead to erosion.

C. Fertilizing
Not advised for longleaf pine.
Definitely a bad idea on old fields. Stimulates weed growth.
Soil pH should be acid. High pH can lead to problems.

II. Pre-planting vegetation management tool kit

A. Mechanical options

1. Shear and rake
Removes vegetation, opens up the site for planting.
Controls some sprouting trees, but leaves many roots to sprout.
May be necessary where vegetation is very dense.
Usually is not enough to control competition.
Exposes soil, can lead to erosion.
Expensive

2. Drum chop
Breaks up stems and roots.
Single drum provides little benefit other than cutting down stems.
May be done in combination with shearing or herbicide.  
Can lead to erosion on sloping sites.  
Not available for small properties

3. Scalp  
Recommended on some pastures and old fields.  
Removes just the shallow roots, runners, some of the seedbank.  
Clears a path for planting machine.  
Can lead to erosion and soil drying.

4. Fire  
A cheap alternative on some sites.  
Most species are adapted to fire and will sprout quickly.  
May be the most desirable tool if retaining broad species mix.  
Not adequate on most sites.

B. Chemical site prep options: Choice determined by target species.  
Adjuvants usually required.: Surfactants, Anti-foaming, wetting/spreading

1. Imazapyr (Arsenal AC, Chopper)  
Uptake through foliage and roots.  
Wide selectivity.  
Legumes are tolerant.  
Apply mid-late growing season  
Often tank mixed with glyphosate, triclopyr for broader control  
12 - 20 ounces AI per acre.

2. Hexazinone (Velpar, ULW)  
Mainly taken up by roots.  
Wide selectivity. Especially effective on oaks, sweetgum  
Yellow poplar, black gum, huckleberry, broomsedge, Bermuda tolerate  
Apply early growing season.  
0.5 to 3 lbs AI per acre (lower rate on sandy soil)

3. Glyphosate (Accord, Rodeo, generics)  
Uptake through foliage. No soil activity  
Wide selectivity of woody and herbaceous plants.  
Maple, cherry, dogwood, greenbrier are tolerant  
RoundUp is not labeled for forestry.
Often tank mixed with imazapyr or Oust.
Apply early to late summer for site preparation.
0.8 to 1.6 lbs AI per acre.

4. Triclopyr (Garlon 3a, Garlon 4)
Garlon 3A water soluble, 44%AI
Garlon 4 water (emulsion) or oil soluble, 60% AI
Pathfinder ready mixed, 14% AI
Uptake through foliage, bark.
Wide selectivity. Frequently used for waxy-leaved species
(gallberry, waxmyrtle, sweetbay)
Controls undesirable pines
Most grasses are tolerant
Often tank mixed with Accord or Arsenal
Apply during growing season.
1 to 8 lbs per acre.
Basal-Bark treatment: 15 – 20% solution in oil.
Will volatize in hot weather and can drift.

5. Metsulfuron Methyl (Escort)
Primarily taken up by roots. Some foliar uptake.
Primary targets are blackberry, cherry, honeysuckle, palmetto.
Labeled for Kudzu.
Often tank mixed with imazapyr, hexazinone.
0.5 to 1.5 oz per acre (.3 to 1 oz AI) for blackberry
3-4 oz per acre (1.8 to 2.4 oz AI) for kudzu
Requires high volume of water, constant agitation.
Longleaf pine is highly susceptible to injury!

III. Vegetation management after planting

A. Herbicides for herbaceous weeds
Band application usually adequate, but how wide?
Use correct per-acre rate, and reduce the acreage treated.
(3 foot bands on 9 foot centers treats only 1/3 of the field.)
Best to apply before weeds have grown over the pines.
Drought-stressed seedlings more likely to be injured.
Surfactants could increase chance of injury to pines: use cautiously or avoid.
Do not use Escort over longleaf pine.
1. Sulfometuron Methyl (Oust)
Roots, some foliage uptake. Pre- and post-emergent. Controls annual broadleaf weeds and grasses. Perennials less susceptible. Broomsedge, Bermuda, trumpetcreeper tolerate it. Apply late winter/early spring (Late Feb – April) 1 to 2 oz AI per acre. Often tank mixed with hexazinone, imazapyr, atrazine. Requires high water volume, constant agitation. Requires rainfall after application to activate. Difficult to clean out of spray equipment.

2. Hexazinone (Velpar L)
Controls a wide spectrum of annuals. Perennials are less susceptible. Often tank mixed with Oust. Apply prior to bud break. 1 lb AI per acre

3. Oustar
Pre-mixed Oust and Velpar

4. Imazapyr (Arsenal AC)
Many broadleaf weeds and grasses, including bahia. Legumes are tolerant. Apply when weeds are small, spring – summer. Can tank mix with Oust. 4-6 oz per acre (2-3 oz AI per acre) Do not use more than once a year. Do not use surfactant when applying over longleaf pine.

5. Fluazifop (FusilladeOX)
Uptake through foliage, post-emergent. Grasses only: annual and perennial, including Bermuda. Sedges and broadleaf weeds tolerate. Short duration. May be applied more than once a season. Apply on young grasses, before seed heads develop. Follow label for timing and rate for specific species. 8-24 oz per acre (2 – 6 oz AI) plus surfactant or crop-oil concentrate. Toxic to fish. Clean spray equipment thoroughly before and after use.
Corn, cereals, turf grasses highly susceptible to injury.

6. Atrazine
Not labeled for use over longleaf?
Uptake through roots.
Pre-emergent or early post-emergent.
Annual grasses and weeds, including:
   - morningglory, hairy crabgrass, barnyardgrass, cocklebur
Apply soon after planting, late winter.
4 pints per acre (2 lbs AI)
Requires rainfall after application to activate.
Toxic to aquatic invertebrates.
Transported through soil.
Avoid water contamination.

B. Mowing
Works best if the rows have been scalped or sprayed.
Avoid injury to pines.
Do not disturb soil between rows!

C. Fire
Burn off matted grasses
Kill unwanted hardwood and other pine species
Control brown-spot

D. Herbicides in young stands (TSI)
Useful if fire is not an option (fuels insufficient or smoke management problems)
Woody plants can be spot-treated in very young stands, but new transplants must be protected from the herbicides. Use only products that are labeled for use over pines, and follow the directions.

1. Seedling release
   a) Imazapyr (Arsenal AC)
      Fall application
      12 - 16 oz. per acre
      Can tank mix with Accord, Escort
      Chopper should not be broadcast over pines.
      Direct spray at target vegetation.

   b) Glyphosate (Accord)
      Do not use over pines less than one year old.
      Apply in early fall, after pine buds have hardened.
      Broadcast 1-1/8 to 1-7/8 quarts per acre.
      Safer to direct the spray to target vegetation.
Often tank mixed with Arsenal AC

c) Velpar L

E. Other Brush Control
Bush hogging/chipping
Goats. Better wait until the pines are out of reach.

F. Resources available on the internet

Crop Data Management Systems, Inc. (CDMS)
Specimen labels and MSDS for hundreds of pesticides.
www.cdms.net

University of Florida IFAS
www.ifas.ufl.edu

Auburn University
Alabama Cooperative Extension Service
www.aces.edu/dept/extcomm/publications

Longleaf Alliance
http://www.longleafalliance.org

Mississippi State University
College of forest Resources
www.cfr.msstate.edu

Southern Regional Extension Forestry
Master Forester and Master Wildlifer programs
Links to publications, other sites
http://sref.info