

# Ecological site F131CY005LA Clayey Flood Plain

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## General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.



Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## MLRA notes

Major Land Resource Area (MLRA): 131C—Red River Alluvium

Major Land Resource Area (MLRA) 131C, the Red River Alluvium, is in Louisiana (86 percent) and Arkansas (14 percent). It makes up about 2,410 square miles. The eastern half of the city of Shreveport and the towns of Alexandria and Bossier City, Louisiana, are in this MLRA. Interstate 20 crosses this area and intersects Interstate 49 in Shreveport. Interstate 30 crosses the northern tip of the area, in Arkansas. Small areas of the Kisatchie National Forest are along the southwest edge of this MLRA.

## Classification relationships

USDA-Natural Resources Conservation Service, 2006.  
-Major Land Resource Area (MLRA) 131C

## Ecological site concept

The Clayey Floodplain ecological site has clay-textured, very deep, somewhat poorly to poorly drained soils that are prone to flooding. Sites can flood for prolonged periods, especially during the winter and early spring.

## Associated sites

F131CY001LA	<b>Sandy Flood Plain</b> Sites are in a similar landscape position, except soils are sandy-textured.
F131CY002LA	<b>Loamy Flood Plain</b> Sites on same landform, but have loamy textures.
F131CY003LA	<b>Clay Cap Flood Plain</b> Sites on similar landforms, but have clay surface textures over loamy subsurface textures.
F131CY004LA	<b>Wet Clay Bottomland</b> Sites are wetter and have prolonged ponding.

## Similar sites

F131DY002AR	<b>Clayey Flood Plain</b> Site is very similar, except in a different MLRA.
F131BY005AR	<b>Wet Clay Bottomland</b> Site is very similar, except in a different MLRA.

**Table 1. Dominant plant species**

Tree	(1) <i>Quercus lyrata</i> (2) <i>Carya aquatica</i>
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

These nearly level to gently sloping soils formed in clayey alluvium derived from the Red River. Slope ranges from 0 to 5 percent, but are typically less than 3 percent. Sites can have a water table even with the surface layer. Water tables fluctuate through the year and are typically highest in the winter and early spring.

**Table 2. Representative physiographic features**

Landforms	(1) Alluvial plain > Flood plain
Runoff class	Medium to high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	12–82 m
Slope	0–5%
Water table depth	0–203 cm
Aspect	Aspect is not a significant factor

## Climatic features

The average annual precipitation is 60 inches, which increases from north to south. Most of the rainfall occurs as frontal storms in spring and early summer. Some high-intensity, convective thunderstorms occur in summer. The total amount of the precipitation that occurs as snow ranges from less than one percent in the southern part of the area to five percent in the northern part. Temperatures range from highs in the low 90's during the summer to lows in the mid 30's during the winter. The frost-free period averages 246 days, while the freeze-free period averages 276 days.

**Table 3. Representative climatic features**

Frost-free period (average)	246 days
Freeze-free period (average)	276 days
Precipitation total (average)	1,524 mm

### Climate stations used

- (1) ALEXANDRIA 5 SSE [USC00160103], Alexandria, LA
- (2) COLFAX [USC00161941], Cloutierville, LA
- (3) LSU DEAN LEE RSCH STN [USC00165630], Alexandria, LA
- (4) RED RIVER RSCH STN [USC00167738], Bossier City, LA
- (5) ALEXANDRIA [USC00160098], Alexandria, LA
- (6) BUNKIE [USC00161287], Bunkie, LA
- (7) ROBSON [USC00167924], Shreveport, LA

### Influencing water features

The ecological site is on floodplains and is prone to flooding from adjacent streams and rivers.

### Wetland description

Most of the soils correlated to this site are considered hydric, but onsite delineations are needed to confirm wetland status according to the United State Army Corps of Engineers.

### Soil features

The ecological site consists of very deep, somewhat poorly to poorly drained, very slowly permeable to impermeable soils formed in clayey alluvium. Soils correlated to this site include: Buxin, Billyhaw, Bossier, Desha, Moreland, Perry, and Portland.

**Table 4. Representative soil features**

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Clay
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	7.62–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–5 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–6
Soil reaction (1:1 water) (0-101.6cm)	4.5–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–10%

Subsurface fragment volume >3" (Depth not specified)	0-2%
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## Ecological dynamics

The information in this ecological site description (ESD), including the state-and-transition model (STM), was developed using archeological and historical data, professional experience, and scientific studies. The information is representative of a complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals, and ecological processes are described to inform land management decisions.

**Introduction** - Almost all of the Red River Alluvium (MLRA 131C) is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain. The southern end is in the Mississippi Alluvial Plain Section of the same province and division. The landforms in the area are level or depressional to very gently undulating alluvial plains, backswamps, oxbows, natural levees, and terraces. Landform shapes range from convex on natural levees and undulating terraces to concave in oxbows. Landform shapes differentiate water-shedding positions from water-receiving positions, both of which have a major effect on soil formation and hydrology. Average elevations start at about 40 feet in the southern part of the area and gradually rise to about 270 feet in the northwestern part. Maximum local relief is about 10 feet, but relief is considerably lower in most of the area.

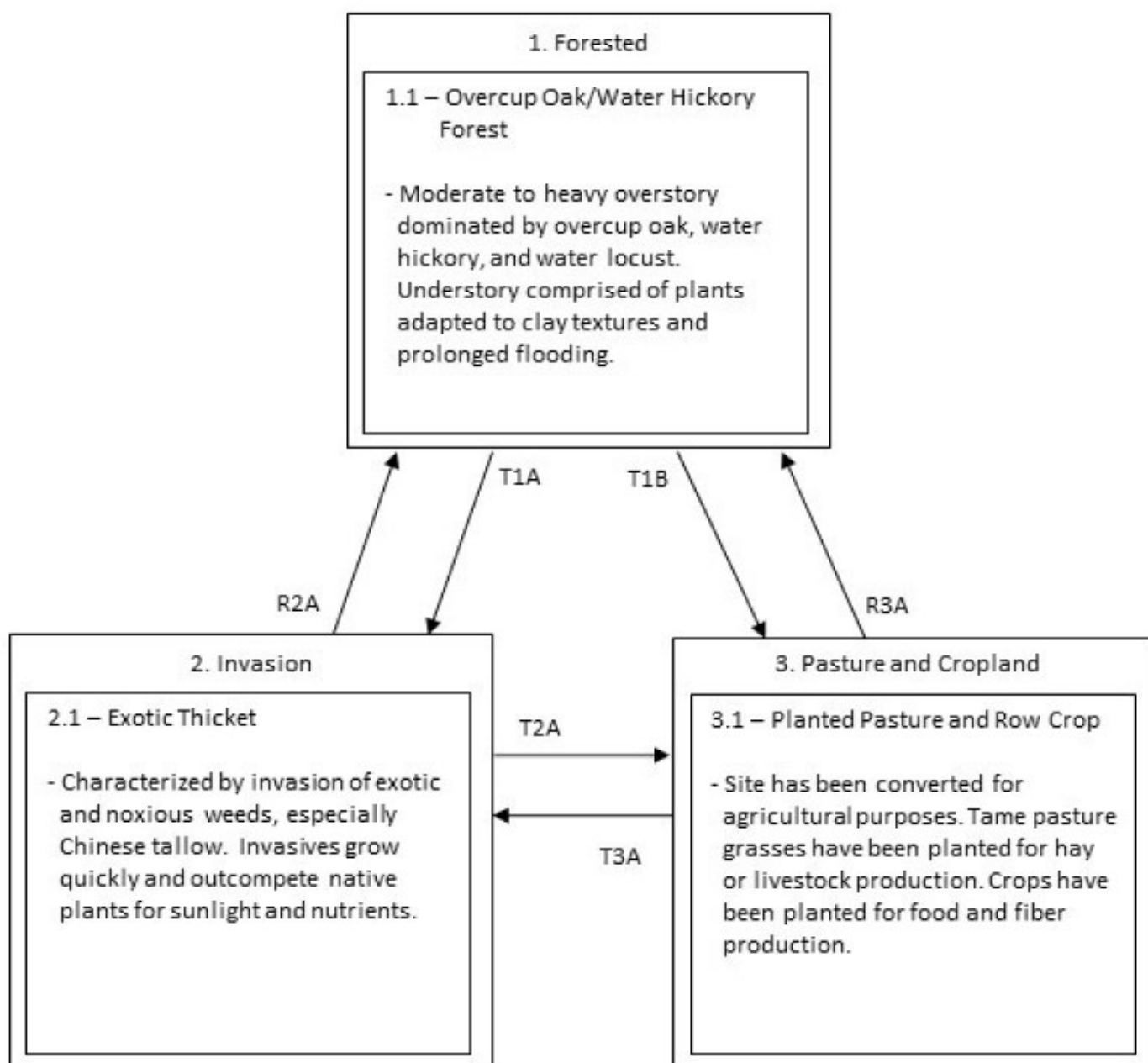
**Geology** - Bedrock in this area consists of Tertiary and Cretaceous sands formed as beach deposits during the retreat of the Cretaceous ocean from the midsection of the United States. Alluvial deposits from flooding and lateral migration of the Red River typically lie above the bedrock. These sediments are sandy to clayey fluvial deposits of Holocene to late Pleistocene age and are many feet thick. In some areas late Pleistocene terrace deposits are within several feet of the present surfaces, but they do not crop out in this MLRA. The geologic history of the area is greatly influenced by a large logjam that formed in the Red River channel in the middle part of the area during the late 18th century and the early 19th century. At the time of its largest extent, the logjam obstructed the river and its tributary outlets for a distance of 160 miles downstream from the Arkansas state boundary. Backwater flooding, reformation of natural levees, and crevasse splays caused by this logjam played a major role in covering large parts of the area with a mantle of recent clayey to sandy material. Destruction of the logjam in the late 1800's resulted in the drainage of many large lakes that had formed.

**Biological Resources** - This area once consisted entirely of bottomland hardwood deciduous forest and mixed hardwood and cypress swamps. The major tree species in the native plant communities in the areas of bottomland hardwoods formerly were and currently are water oak (*Quercus nigra*), Nuttall oak (*Quercus texana*), cherrybark oak (*Quercus pagoda*), pecan (*Carya illinoensis*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), eastern cottonwood (*Populus deltoides*), and hickory (*Cary sp.*). The major tree species in the native plant communities in the swamps formerly were and currently are bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquatica*), green ash (*Fraxinus pennsylvanica*), and black willow (*Salix nigra*). The important native understory species are palmetto (*Sabal minor*), greenbrier (*Smilax sp.*), wild grape (*Vitis sp.*), and poison ivy (*Toxicodendron radicans*) in the areas of bottomland hardwoods and buttonbush (*Cephalanthus occidentalis*), lizardtail (*Saururus cernuus*), waterlily (*Nymphaea sp.*), sedges (*Carex sp.*), and rushes (*Juncus sp.*) in the swamps.

**Land use** - Land use varies throughout the MLRA, consisting of 37 percent cropland, 20 percent grassland, 31 percent forest, 5 percent urban development, 5 percent water, and 2 percent other. Farms and scattered tracts of forested wetlands make up nearly all of this area. The farms produce mainly cash crops. Cotton, soybeans, milo, and corn are the main crops. Sugarcane is a major crop in the southernmost part of the area. In many areas furrow irrigation is used during droughty parts of the growing season. Throughout the area, catfish are produced commercially on farm ponds that are contained by levees. Migratory waterfowl are harvested throughout the area. Hardwood timber is harvested on some forested wetlands, and most forested areas are managed for wildlife.

**Conservation** - The major resource concerns are control of surface water, management of soil moisture, and maintenance of the content of organic matter and productivity of the soils. Conservation practices on cropland generally include nutrient management, crop residue management, and alternative tillage systems, especially no-till systems. In many areas land leveling or shaping optimizes the control of surface water. Other major cropland management practices are control of competing vegetation and insects through aerial or ground spraying of herbicides and insecticides and fertility management programs that make use of chemical fertilizers.

## State and transition model



Code	Practice
T1A	Invasion by exotic weed(s).
T1B, T2A	Site is prepared and planted to grass or crops.
T3A	No management and invasion by exotic weed(s).
R2A	Removal of invasive plants through biological, mechanical, or chemical control(s).
R3A	Tree planting and return to natural flooding intervals.

Figure 6. STM

### State 1 Forested

The overall state has a high overstory cover of bottomland hardwood species. The dominant overstory species are overcup oak (*Quercus lyrata*), water hickory (*Carya aquatica*), and water locust (*Gleditsia aquatica*). Flooding is common, varying from brief durations to long durations depending on micro-relief, size of precipitation events, and current saturation of the soil. The most common disturbance is treefall due to windthrow. The rooting systems in the

bottoms are oftentimes shallow. In combination with some mortality due to prolonged flooding, downed trees and upright snags are common. A canopy-clearing disturbance, such as hurricanes or tornadoes, can be inhabited by light-seeded species. If advanced oak reproduction is present at time of disturbance the stand will retain its oak dominance. Oaks will sprout, grow, die-back, and regrow for many years. Otherwise, green ash and sweetgum will colonize the canopy due to their rapid growth and ability to grow into the crown early.

## **Community 1.1**

### **Overcup Oak/Water Hickory Forest**

Besides the co-dominants overcup oak and water hickory, associate species may include: green ash, hackberry (*Celtis laevigata*), swamp dogwood (*Cornus foemina*), and swamp privet (*Forestiera acuminata*). Buttonbush is a common understory shrub. Sedges and other herbaceous vegetation adapted to seasonally prolonged flooding inhabit the forest understory.

## **State 2**

### **Invasion**

Chinese tallow (*Triadica sebifera*) is an undesired, invasive species brought to the United States in 1776 (Randall & Marinelli, 1996). Rapid expansion along the gulf coastal states has allowed the species to invade many ecosystems and consequently reduce diversity. Tallow trees are known to cause gastrointestinal upset, contact dermatitis, and toxicity in livestock and humans. Mechanical and chemicals options exist as a means to control the trees.

## **Community 2.1**

### **Exotic Thicket**

Chinese tallow invade the ecological site via flooding events as nearby waterways transport seeds. Once settled, the seeds produce saplings viable to reproduce seeds in as little as three years. The rapid establishment immediately blocks sunlight to understory species and reduces diversity. Unabated growth quickly allows the saplings to grow into the overstory, thus changing the ecological state entirely. Reductions in size and number of all vegetative species are seen in all canopy tiers.

## **State 3**

### **Pasture and Cropland**

The Pasture and Cropland State is a result of conversion activities. The landowner has maximized agriculture production by planting a monoculture of introduced grass species or agricultural row crops.

## **Community 3.1**

### **Planted Pasture and Row Crop**

Typical perennial warm-season grasses include Bermudagrass, bahiagrass, dallisgrass, and Johnsongrass. Spring and fall forages may include legumes such as clover. The grasses are grown for livestock production through direct grazing or baling hay for later use. Agricultural row crops are grown for food and fiber production. Typical crops include cotton, soybeans, milo, corn, rice, and sugarcane. Many farmers use herbicides to reduce unwanted plant competition which yields a plant community unrepresentative of State 1 or subsequent vegetative states.

## **Transition T1A**

### **State 1 to 2**

The transition from State 1 to State 2 is a result of occupancy by invasive species or other noxious weeds. Invasive plants outcompete, and eventually choke out, all other native species.

## **Transition T1B**

### **State 1 to 3**

The transition is due to the land manager maximizing agricultural production. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

## **Restoration pathway R2A**

### **State 2 to 1**

The driver for restoration is control of Chinese tallow. Although an option, mechanical removal of the trees is difficult because they readily regrow from roots and seeds. Several chemical methods are available, including glyphosate for cut-stump treatments, triclopyr for cut-stump and foliar treatments, imazamox for broad spectrum application, and imazapyr as a foliar spray. Many aquatic herbicides have water use restrictions and can potentially kill hardwoods, so labels and restrictions should be read carefully prior to application.

## **Transition T2A**

### **State 2 to 3**

The transition is due to the land manager maximizing agricultural production. Merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

## **Restoration pathway R3A**

### **State 3 to 1**

This restoration pathway may be accomplished by restoring bottomland hardwoods. Restoration efforts for bottomland hardwood forests have proven difficult and much research has been done on these ecosystems. Many times restoring the function of the ecosystem is the most difficult obstacle. Evapotranspiration and hydroperiod are closely linked and may never fully be restored until a forested condition exists again (Stanturf et al., 2001). Local tree availability may limit the possibilities of species composition. Careful planning of available species, site design, and further management actions should be conversed with a knowledgeable restoration source. With this in mind, oftentimes late summer and early fall are the best times to begin due to possibly wet conditions during the late fall to early spring. Many detailed guides have been written to assist with restoration, and suggested readings include, "A Guide to Bottomland Hardwood Restoration" (Allen et al., 2001).

## **Transition T3A**

### **State 3 to 2**

The transition is due to the land manager not managing the invasion of exotic weeds. Without proper management, the crops and pastures can become an exotic thicket of invasive species that becomes increasingly harder to control.

## **Additional community tables**

### **Inventory data references**

This site description was developed as part of the provisional ecological site initiative using historic soil survey manuscripts, available range site descriptions, and low intensity field sampling.

### **Other references**

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## Contributors

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## Approval

Bryan Christensen, 9/22/2023

## Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	12/18/2020
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant:

Sub-dominant:

Other:

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth ( in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if**

**their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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**17. Perennial plant reproductive capability:**

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