EAST FORK OF THE ILLINOIS RIVER

WATERSHED ANALYSIS

SYNTHESIS MODULE

US FOREST SERVICE
Illinois Valley Ranger District

BUREAU OF LAND MANAGEMENT
Grants Pass Resource Area

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SYNTHESIS MODULE

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I. PURPOSE

This module of the East Fork Illinois River Watershed Analysis provides a synthesis of the aquatic, terrestrial, and social modules. Its purpose is to identify priorities for maintenance and restoration of multiple integrated resource values.

II. METHODS

An interdisciplinary team consolidated all the resource issues discussed in the three preceding modules of the watershed analysis into the following resource values (arranged alphabetically):

- Critical Fish Habitat
- Cultural Resources
- Fire Hazard
- Forest Products
- Large Wood Delivery Potential
- Old Growth Forest Habitat
- Rare Plants
- Recreation
- Savannas and Grass / Forb Habitats
- Water Quality

For each resource value, the related hazards and risks were considered to assess relative priorities for management actions and treatments.

III. VALUE RATINGS

Each resource value was considered within the context of 20 drainage analysis areas in the East Fork Illinois watershed. Individual analysis areas were rated based on the importance of each value within that drainage. Factors considered in determining the ratings include, but are not limited to, fish bearing streams, fire hazard, stand density, slope stability, interior mature and old growth habitat connectivity, land allocation and management emphasis, perennial stream flow, road/stream crossings, road density, road location, potential for recovery, noxious weeds, rural interface, fish barriers, dead wood, species composition shifts, and tree pathogens. The drainage analysis areas were also rated for their overall priority for restoration and maintenance treatments based on an aggregation of the priorities. Hazard and risk for each value were determined within each drainage analysis areas. The ratings for each drainage analysis area are summarized on the following maps;

- Critical Fish Habitat Maintenance Value
- Critical Fish Habitat Restoration Value
- Cultural Resources Sites Present / High Probability Area
- Cultural Resources Interpretation Value
- Large Wood Delivery Potential Maintenance Value
- Private Property and Public Safety Maintenance Value
- Private Property and Public Safety Restoration Value
- Old Growth Maintenance Value
- Old Growth Restoration Value
- Rare Plants - Maintenance and Restoration Value
- Recreation Use Value
- Recreation Increased Management Value
- Savannas and Grass / Forb Habitats Maintenance Value
- Savannas and Grass / Forb Habitats Restoration Value
- Resource Value Ratings - Aggregate

A. Hazard

Each resource value is susceptible to a unique set of potential hazards; hazards are defined as existing or potential disturbance factors such as wildfire, timber harvest, insect or pathogen infestations, erosion and soil mass movement, etc.

B. Risk

Risk is defined as the relative probability of a hazard actually occurring. For example, a given stream has a hazard of significant sediment delivery through erosion and landslides. However, the risk, or potential for delivery, may be low if soils and geology in the delivery area are relatively stable. Risk assessment can identify data and monitoring needs and provides the decision maker with critical information to determine which areas are the best candidates for treatment based on value, hazard, risk and economics.

C. Value Descriptions and Priority Areas

Resource value ratings for each of the drainage analysis areas are summarized in Appendix A Table S-A-1. The ratings are discussed further in this section.

1. Critical Fish Habitat

Critical fish habitat is essential for the survival and completion all life stages of anadromous and resident fish, especially the Southern Oregon/Northern California coast coho salmon, which is listed as a threatened species under the Endangered Species Act. The East Fork is a primary contributor to the Illinois River basin salmonid population. At least 50% of the Rogue River basin coho production comes from the Illinois River. Designated critical habitat for Southern Oregon/Northern California coast coho salmon (Fed. Reg./Vol.64/No.86/May 5, 1999) includes all waterways, substrate, and adjacent riparian zones below longstanding, naturally impassible barriers (i.e., natural waterfalls in existence for at least several hundred years).

Potential hazards to critical habitat within the East Fork Illinois River watershed are floods, landslides, water quality, inefficient water withdrawals (i.e., gravel push-up dams), migration barriers, and direct habitat disturbance (i.e., suction dredge mining and gravel removal). Floods and landslides can dramatically change stream geomorphology. With lower stream flow, there is an increase in the surface area to volume ratio, resulting in increased temperature from solar radiation and a decrease in pool habitat for fish. Fire, timber harvest, rural development, agriculture, and landslides can all affect stream shading, a component of water quality, which, in turn, affects critical fish habitat.

Natural hazards (floods, landslides, debris flows, fire) can be periodic and exacerbated by human intervention. Critical habitat is especially vulnerable to these hazards when they occur outside their natural range of variability. Further hazards include road crossings and water withdrawals that limit fish passage, and ground disturbing activities that contribute sediment to streams. Salmonid productivity is affected by shade reduction, high sediment smothering redds, no rearing habitat, and inaccessible spawning grounds.

Conclusion: The need to maintain and restore critical habitat is high throughout the entire watershed. Because streams are dynamic, upland in-stream activities impact downstream conditions. The highest priority is to restore fish passage in areas where passage is limited, and restore large wood in streams and riparian areas. The most important known spawning and critical habitat areas are above the green bridge at the Forest Service boundary, Dunn Creek drainage, and the lower reaches of tributaries to the main stem of the East Fork.

2. Cultural Resources

The East Fork of the Illinois River watershed has a rich cultural history. Features include prehistoric lithic scatters, large hydraulic mine complexes, and sites relating to early day Forest Service activities. In addition, the watershed has numerous high probability areas for cultural resources that are not yet inventoried. Cultural resources are nonrenewable resources. Each site or complex is unique and serves as a window to the past. Once a site is destroyed or its integrity violated, valuable information to reconstruct culture history is lost. Sites must be inventoried through a formal process to determine their eligibility to the National Register of Historic Places (NRHP).

Hazards to cultural resources are primarily associated with ground disturbing activities, and to a lesser extent wildfire. Examples of ground disturbing activities include timber sales, road and trail construction, and off-road vehicle use. Looting (pot hunting) can also destroy sites.

Mitigation of hazards to cultural resources on public lands is managed through the cultural resource management process. Sites are inventoried, described, and evaluated for their potential to the NRHP. If a proposed undertaking will have an effect on a significant cultural resource, appropriate means of treatment are designed and implemented. Treatment primarily takes two forms: (1) modification of the undertaking and (2) data recovery.

The risk to cultural resources from management related activities is generally low. Literature reviews, professional judgements and field surveys are used to minimize risk. An attempt is made to survey all high and a percentage of medium and low probability areas. It is possible, however, to miss sites due to terrain, forest duff, and areas of impassible brush.

In high probability areas that have received a surface survey but revealed no sites, subsurface testing can determine if buried deposits are present. This can also take place when, for example, a toilet is installed or a road is constructed and is another avenue to lessen the chance of impacting unrecorded sites.

Fire can impact cultural resources. A review of existing sites is conducted in the advent of a wildfire to provide protection to structures and sites. But suppression activities are often insufficient to protect resources. An example is the 1987 Longwood Fire, which consumed many wooden features associated with mine ditches in the East Fork Illinois River watershed.

Looting of sites and artifacts is always a hazard.

Conclusion: The areas of highest value are located on BLM lands in Allen Gulch, Scotch Gulch, and French Flat. This complex of sites contains numerous mines / headwalls, ditches, town sites, and

other features associated with the earliest episodes of mining in the area and subsequent development as a major factor in the region's economic development. The areas have high site integrity and contain many opportunities for interpretation. It may have potential for designation as a National Historic Mining District. Such a designation would not preclude vegetation management, however, sites must be protected from ground disturbing activities. Control of off-road vehicles is important in protecting the integrity of the area.

3. Fire Hazard

The value of public safety and private property is high. A hazard to public safety is wildfire. The risk is greatest within the rural interface where federal and private lands adjoin. All BLM lands in this watershed are considered to be within the rural interface. The risk of a wildfire occurring in the rural interface is high.

Conclusion: Priority locations for hazard reduction treatments are Allen Gulch, Scotch Gulch, Lower East Fork Illinois, and Khoeery Creek. Fuels should be reduced first in areas adjacent to private lands and residences. Fuels treatments are recommended throughout the watershed.

4. Forest Products

The East Fork Watershed is an important source of forest products. Forest products include (but are not limited to) individual collection of mushrooms, decorative plants or plant parts, firewood, post and poles, and timber sales. Timber values were specifically evaluated for this synthesis document, however, the value of forest products within Late-Successional Reserves and Riparian Reserves was not assessed, because programmed timber harvest does not occur in these areas. (Forest products may be removed from Late-Successional and Riparian Reserves where the purpose of their removal meets or is to meet the objectives of the land allocation.)

The forest product rating in Table S-A-1 is based on potential timber production conditions on Matrix land allocation lands in each drainage analysis area. Drainages with significant acreage within Matrix include: Allen Gulch, Cedar Gulch, Chapman Creek, Dunn Creek, Lower East Fork Illinois, East Fork - Scotch to Dunn, Elder Creek, Kelly Creek, Khoeery Creek, Little Elder Creek, Page Creek, Scotch Gulch, and Tycer Creek. Table S-A-1 indicates the relative amount of timber available within Matrix lands (first rating letter), and the need for silvicultural treatment within that drainage (second rating letter).

Conclusion: Hazards to timber production include forest pathogens (insects and diseases), intense wildfire, and stand density based competition for light and moisture (from other trees or vegetation). The risk of these hazards occurring is generally high. Active stand management using silvicultural techniques such as thinning, planting, site preparation, and regeneration harvesting can reduce the risk and hazard levels.

5. Large Wood Delivery Potential to Streams

Large wood provides cover, nutrients, shade, and habitat for aquatic and terrestrial organisms. The delivery of large wood depends on natural processes. In intermediate sized streams, large instream

wood strongly influences the morphology of the stream channel as well as the routing and storage of sediment and water; it may be the principle factor in determining the characteristics of aquatic habitats (Franklin et al. 1981).

Hazards to large wood delivery potential can be both natural and anthropogenic. A lack of large trees (hence, a lack of a wood source) near streams would be a hazard. Because wood is often delivered through landslides, areas with stable soils and/or low slopes outside the transient snow zone are less likely to deliver wood. Other hazards include road culverts that block wood from flowing downstream. The risk to large wood delivery potential is dependent on elevation, slope, soil type, road crossings, road locations, and upland disturbance.

Conclusion: Priority treatment areas for maintaining large wood delivery potential include Upper East Fork, Sanger Creek and Scotch Gulch. Restoration areas include Cedar Gulch, Chicago Creek, Elder Creek, and Long Gulch. The potential for large wood delivery is not as high on BLM lands because there are no unstable granitic soils, most slopes are low, and very little land is in the transient snow zone. Khoeery, Tycer, Kelly, and Chapman Creek drainages have moderate priority for both maintenance and restoration. These areas lie partially within the transient snow zone in areas with greater than 55% slope and have a high percent of the riparian reserve in mature/old growth (in the case of Tycer, greater than 11" dbh).

6. Old Growth Forest Habitat

The term “Old growth” relates to a subset of late-successional forest. For National Forest lands this is defined as having at least eight trees per acre that are larger than 32" dbh and canopy closure greater than 40%. The more inclusive term, late-successional, is defined as a stand having more than half the trees greater than 21" dbh. On National Forest lands the acreage of late-successional forest is comparable to the reference condition but the acreage of old growth is less. BLM data addresses late-successional forest without subdividing it.

The value of old growth is high wherever it occurs. Value is greatest where old growth occurs in large patches, Riparian Reserves, or when it is part of large patches of late-successional forest habitat.

The main hazards to maintenance or restoration of old growth are wildfire, high stand densities, and timber harvest, especially regeneration harvest. Wildfire hazard (due mostly to high stand densities of trees less than 21" dbh) to maintenance or restoration of old growth is moderate for about 70% of the habitat (including current and potential old growth), whereas the desired hazard level is low for about 90% of the area.

Priority locations to reduce fire hazard are within the areas identified on Map 27 The Best Mature and Old Growth Habitat Patches and Their Connections and Map24 Potential High Priority Areas for Hazard Reduction. Areas at lower elevations are particularly important. Priority areas for the BLM are Allen Gulch, Chapman Creek, Khoeery Creek, Little Elder Creek, Lower East Fork drainage, and Tycer Creek.

Excessive stand densities are a hazard to old growth maintenance and restoration because they

increase large tree mortality, retard growth, and cause species composition changes; most significantly, the decline of shade intolerant conifers, hardwood, shrub, and herbaceous species. The timber harvest hazard to old growth is high in the Matrix land allocation and very low in other allocations under current federal land management plans.

The risk of wildfire, excessive stand density, and timber harvests varies. Wildfire risk depends on the chance of a fire starting at a time and in a location that makes it difficult to stop. The risk of ignition is high where human use is frequent, such as adjacent to human populations and well traveled roads, and where lightning frequently strikes. The risk of ignition resulting in a large fire during hot, dry conditions is high, given current watershed fuel loadings.

The risk of excessive stand density occurring is very high; stand densities are high in all areas except those that have been recently thinned, either pre-commercially or commercially. The risk of the regeneration timber harvest hazard is high within Matrix lands.

Conclusion: On National Forest lands, priority areas for fuel hazard and stand densities reduction work to protect old growth habitat is indicated on Map 27 The Best Mature and Old Growth Habitat Patches and Their Connections. Areas in Page, Lower Elder, and Little Elder Creeks and the connection along Buckhorn Ridge are of highest priority. The patch in Dunn Creek between the North Fork Dunn and Poker Creeks, and the connections from this patch are of lesser priority. The patch in the upper reaches of Poker Creek and its associated connections are of lower priority. Priority areas on BLM lands are in Allen Gulch, Khoeery Creek, Little Elder Creek, Chapman Creek, Tycer Creek and Kelly Creek. Riparian Reserves outside these drainages are also priority treatment areas.

7. Rare Plants

The value of rare plant species is high wherever they occur. Their abundance tends to be higher in serpentine soils, wet areas, and old growth forest habitat. About 40 percent of the BLM lands in the East Fork watershed are in a botanical emphasis area.

The hazards to rare plants are severe intensity wildfire (moderate to high hazard), timber harvest (see above for hazard description), and off-road vehicle use. The risk of severe intensity fire, timber harvest, and off-road vehicle use varies. For a description of the wildfire risk and timber management risk in old growth habitat, see above discussion. The risk to rare plants from timber management in Matrix lands is low because plant surveys and required management for known sites avoid or minimize impacts to populations. The risk to rare plants from off-road vehicle use is high near roads where gentler slopes are conducive to off-road driving.

Conclusion: Priority areas for rare plant treatment coincide with old growth and savannah areas (see these discussions). Priority BLM areas are Scotch Gulch, Allen Gulch, Khoeery Creek, and Little Elder Creek. A Research Natural Area (RNA) designation has been proposed by the BLM for portions of Allen Gulch and Scotch Gulch. Resource values for the proposed RNA include unique serpentine plant communities (Scotch Gulch) and late-successional tanoak forest (Allen Gulch). The majority of the area in this proposed RNA is BLM, with a small inclusion (about 25 acres) of Forest Service lands.

8. Recreation

Recreation use on National Forest lands is diverse. Activities include swimming, hiking, backpacking, horseback riding, fishing, and driving for pleasure. Two major concentrated use areas are Hogue Pasture and the Page Creek meadow area, both of which are located near Takilma. Other popular recreation areas are Whiskey Lake and Camp Chicago, located near Sanger Peak. Concentrated use areas are often adjacent to riparian areas. The Page Mountain Sno-Park is the only developed Forest Service recreation site in the watershed area. In addition, The State of Jefferson Scenic Byway traverses through part of the watershed.

BLM lands in the watershed are used for dispersed recreation activities such as horseback riding, hiking, OHV and mountain bike riding. This use is concentrated in the French Flat Area of Critical Environmental Concern (ACEC), Allen Gulch, Rockydale Road area and the area around Limestone Rock in the northern part of the watershed. There are many non-maintained trails on BLM lands in the watershed that are used by OHVs, hikers and horseback riders. Deleterious off highway vehicle use is also occurring in the French Flat ACEC.

Areas with high recreation value include Allen Gulch, Chicago Creek, Dunn Creek, Upper East Fork, Page Creek, Sanger Creek and Scotch Gulch. High value areas also have a high need for increased management. Areas of moderate recreational use and, therefore, moderate value, include Lower East Fork, East Fork (Scotch to Dunn), East Fork (Bybee to Chicago), Elder Creek, Khoeery Creek, and Poker Creek.

Hazards to recreation resources are primarily associated with ground disturbing activities, and to a lesser extent wildfire. Examples of ground disturbing activities include timber sales, mining and road construction. Natural disturbances such as erosion can be a hazard to trail systems. Inappropriate uses can also be hazardous to recreation sites, e.g., motorized use in an area not suitable for motorized use.

Conclusion: Priority areas for treatment include existing and potential recreation sites and trails in high value areas, such as Allen Gulch, Chicago Creek, Dunn Creek, Upper East Fork, Page Creek, Sanger Creek and Scotch Gulch. Priority areas on Forest Service lands include Page Mountain Sno-Park, the Hogue Pasture and Page Creek Meadow area, Whisky Lake and Camp Chicago area. On BLM land, higher priority areas include Allen Gulch, Scotch Gulch, and French Flat. Control of off highway vehicles in French Flat and the surrounding areas is important to protect cultural and botanical resources.

9. Savannas (pine and deciduous oak) and grass/forb (meadows and forest under-story).

Jeffery pine savanna occurs within serpentine lands. The deciduous oak savanna is generally outside of serpentine, and contains ponderosa pine and black or white oak. Another savannah type is characterized by ponderosa pine.

The value of savanna and grass/forb habitats is high. Values are greatest at lower elevations or on south aspects because of their importance to wintering wildlife.

The hazards savanna and grass/forb habitats come primarily from excessive stand densities and high severity fire. Timber management practices can either conflict with or contribute to maintenance and restoration of savannah and grass/forb habitats. Practices that retain early seral species and allow of adequate mineral soil exposure to regenerate these species contribute to maintenance and restoration goals.

The hazard to savanna and grass/forb habitats from excessive stand densities is high. Over-dense stands result in the elimination of pine, deciduous oak, and grass/forb species, thus changing savanna and grass/forb habitats to forest habitat. The hazard of a severe wildfire is moderate to high for the larger pine and oak species and low for grass/forb species (wildfire should increase the amount of grasses/forbs). Prescribed burning that retains high amounts of duff and litter retention may not be adequate to maintain these habitats.

The risk of the above hazards occurring varies. The risk of elevated stand densities is high because the condition already exists. For a discussion of the risks of fire hazard and timber management occurring, see the discussion for Old Growth.

Conclusion: To restore savanna and grass/forb habitats, reduce stand densities. To maintain these habitats, use prescribed fire where deciduous oaks are located and in portions of the Jeffery pine plant series. (See:Map 9A Plant Series, Map 9B East Fork Plant Series and Map 5 Plant Material and Soil Depth) Areas of remnant deciduous oak savannas are at lower elevations in the mainstem of the East Fork drainage and in Dunn, Page, Little Elder, Elder, and Chapman Creeks, Lower East Fork Illinois (French Flat) and possibly Allen Gulch. Native vegetation conditions within Allen Gulch are difficult to discern due to intense mining history and its effects on habitat.

10. Water Quality

Adequate stream flow, cool temperatures and clean water are valuable for ecological and societal needs. Aquatic ecosystems as well as people living and working (mining, farming, etc.) in the valley are highly dependent on cool, clean water. Aquatic biota, especially cold-water organisms, rely on good water quality to complete their life cycles. Stream density for drainages in this watershed ranges from 2.1 to 7.5 miles per square mile.

Potential hazards to water quality include droughts, inefficient water withdrawals (i.e., gravel push-up dams), excessive water rights, and high solar radiation heating of the stream (Brown 1980). With lower stream flow there is an increase in the surface area to volume ratio, resulting in increased temperature from solar radiation and a decrease in pool habitat for fish. Removal of riparian vegetation (extremely low canopy cover) and/or topographic features as a result of fire, harvest, rural development, agriculture, and landslides affect the quality of water in the watershed.
Further hazards include road crossings, locations and densities as well as rural development and agriculture. Roads near streams can decrease shade, increase the stream network through drainage ditches, increase sediment input, and prohibit or exacerbate natural stream dynamics (i.e., debris flow, fish passage). Rural development, road building, and agriculture can also cause channelization (through diversions) and contamination (from sewage, fertilization). Degraded water quality and landslides, due in part to human activities, greatly affect channel morphology and the overall function of streams as they relate to living organisms, including humans.

Natural hazards (landslides, debris flows, floods, fire) can be periodic and exacerbated by current

conditions (upland disturbance, road crossings/locations, high fuel load, stream channelization). Water quality is vulnerable to excessive upland disturbance as a result of fire and landslides, inefficient water withdrawals coupled with a high number of water rights, and loss of riparian vegetation and channelization from further rural development. The Longwood Fire, bare soils adjacent to streams (due to campgrounds and mining) and channelization due to roads may contribute to current water quality. Upland disturbance such as the right-of-way for power lines in Dunn, Elder, and Litter Elder Creek drainages is a long-term loss of vegetation.

East Fork Illinois River was listed on the 1998 Oregon DEQ 303(d) list of Water Quality Limited Bodies as water quality limited for flow modification and stream temperature (seven-day average high temperatures exceeding 64°F). Consequently, hazard and risk are high for the East Fork from the mouth to the California border and all of the Dunn Creek drainage. East Fork from the mouth to the California border has a documented impaired aquatic community, flow requirements that are frequently not met, and a human contribution to reduction of in-stream flows below an acceptable level. There is some question, however, as to whether the system was historically able to meet the current water temperature goals. This will be addressed further in a Water Quality Management Plan currently planned for completion in 2003.

Conclusion: The need to maintain good water quality is high in Bybee Gulch, Chicago Creek, East Fork from Bybee to Chicago, Upper East Fork, and Sanger Creek. The need to restore water quality is high in Allen Gulch, Chapman Creek, Dunn Creek, East Fork from the mouth to the California border, Kelly Creek, Khoeery Creek, Long Gulch, Page Creek, Scotch Gulch, and Tycer Creek. Specific road recommendations are part of the watershed analysis documentation.

The highest priority for restoration is removing the gravel push-up dams on the East Fork and replacing them with more efficient water withdrawal systems. Secondly, a Water Quality Management Plan needs to be written for the East Fork Illinois Watershed to determine the cause of degraded water quality and to develop a restoration plan.

Further high priority areas include those with high road densities, high stream crossings per stream mile, and high number of road miles per stream mile in riparian areas (see Appendix B). Six drainage analysis areas have at least 1.5 stream crossings per stream mile (Appendix B). Half of the drainage analysis areas have road densities greater than 3 miles / mi^2 and seven drainage analysis areas have at least 0.25 miles of road per stream mile in the riparian reserve (Appendix B). Based on the combination of road densities greater than 3 mi/mi^2 and many valley bottom roads, some of these drainage areas are considered "not properly functioning for road density and location" according to NMFS (1996) criteria. The drainage analysis areas that are characterized this way are primarily those in the lower portions of the watershed where the land ownership is primarily private. When analyzing the effects of specific roads on a stream system, other factors which must also be considered include: road condition, road grade, surfacing, soil type, stream crossing type and number, and condition and placement of drainage structures.

D. Maintenance and Restoration Priority Value Ratings

Each drainage was rated based on its aggregate overall priority for maintenance and restoration treatments of some type within the next five years. These are summarized below and in Appendix A - Table S-A-1. See also Maps 30 through 38.

1. Allen Gulch: High

The streams in this area have water quality issues such as flow modifications, high sediment input, road impacts to streams, and critical coho habitat. The area also has possible Resource Natural Area (RNA) potential, survey and manage species, matrix lands, and late-successional tanoak forest. Cultural resource and recreation values are also high.

2. Bybee Gulch: Low

Although this area is critical coho habitat and has significant road impacts to streams, it has good water quality and the need to maintain that is high. There is very little mature and old growth forest habitat.

3. Cedar Gulch: Low

This is a small, isolated parcel with difficult access. Roads moderately impact streams and water quality. There is very little mature and old growth forest habitat.

4. Chapman Creek: High

This drainage contains two large Matrix parcels (280 acres and 94 acres) of older forest. There is also a high potential and need for restoration in water quality, fish habitat and road impacts to streams. This area is a lower priority for cultural and recreation values.

5. Chicago Creek: Low

This drainage contains old growth stands that have a low priority for treatment or restoration but high priority for maintenance. Critical fish habitat does not exist within Chicago Creek. The area has the highest potential for mass failure and has high road densities. Cultural resource values are also low.

6. Dunn Creek: High

Recreation values are high as well as biological values. This area contains low elevation old growth, black oak savannas, matrix lands with significant silvicultural needs, and critical coho habitat. There is high restorative potential for water temperature.

7. East Fork Illinois below Chapman Creek: Low

This area has water quality concerns and is critical fish habitat, but contains little federal land, resulting in the low priority.

8. Lower East Fork Illinois River: High

A portion of the French Flat Area or Critical Ecological Concern is within this drainage. It is otherwise allocated to matrix, has water quality issues, and is critical fish habitat.

9. East Fork Illinois, Scotch Gulch to Dunn Creek: Moderate

Cultural and recreation values are high. Most of the BLM lands in the matrix land allocation are not in the timber base. There is high restorative potential for water quality and critical fish habitat. The area is not very accessible due to private land.

10. East Fork Illinois, Bybee Gulch to Chicago Creek: Moderate

Recreation, cultural, and biological values are all moderate.

11. Upper East Fork: Unresolved

This area has high recreation value (Wilderness area), moderate terrestrial ecosystem value for restoration (high value for maintenance) and low value for restorative work in fisheries and hydrology.

12. Elder Creek: High

This area has high biological value and need for restoration treatments. It contains low elevation old growth, serpentine communities, including rare plants and Jeffery pine savannas. Streams rate highly for restoration work in fisheries and hydrology. The federal land allocation contains matrix.

13. Kelly Creek: Moderate

Although this area contains critical coho habitat and spawning reaches and has high restorative potential for water quality, it is mostly in private ownership. The federal land allocation contains matrix.

14. Khoeery Creek: High

This drainage contains low elevation old growth, serpentine communities, including rare plants and Jeffery pine savannas. Road impacts to streams are considerable and the area contains coho habitat. Old growth stands occur on BLM and adjacent FS lands. However, this watershed is mostly in private ownership.

15. Little Elder Creek: High

Rare plants, Jeffery pine communities, commercial timber, low elevation mature and old growth forest are found here. Critical coho salmon habitat and recreation/cultural values add to the area's priority status. The federal land allocation contains matrix. Cultural resource values are high and recreation values, moderate.

16. Long Gulch: High

Although recreation, cultural, and terrestrial ecosystem concerns are low, fisheries and hydrology values and needs for restoration treatments are high, given the occurrence of slides, past wildfire, road impacts and associated effects on water quality.

17. Page Creek: High

Cultural resource and recreation values and concerns are high. Old growth, meadows and black oak savannas result in high terrestrial value and critical coho salmon habitat is also found here.

18. Sanger Creek: Unresolved

This watershed is adjacent to the Siskiyou Wilderness and recreation values are very high. However, biological restoration needs are low; a goal for this area is maintenance of old growth, large wood delivery potential and water quality values.

19. Scotch Gulch: High

This area has very high cultural resource value for both FS and BLM. Maintenance of the current large wood delivery potential is of high priority. Water quality values and need for restoration are high, as are fish habitat maintenance needs. Terrestrial values are also high (Del Norte salamander habitat, a proposed RNA, rare plants, and unique serpentine habitat The federal land allocation contains matrix.

20. Tycer Creek: Moderate

This drainage is mostly privately owned but contains a small amount of federal matrix land. The drainage has high fisheries values and a high need for improving water quality. Terrestrial values are moderate. Cultural and recreation values are low.

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Appendix A: Resource Value Maintenance and Restoration Ratings

Table S-A-1: Resource Value Maintenance and Restoration Ratings										
Drainage Analysis Area	Critical Fish Habitat [1]	Cultural Resources [1]	Fire Hazard [1]	Forest Products [1]	Old Growth [1]	Large Wood Delivery Potential [1]	Rare Plants [1]	Recreation [1]	Savannas and Grass/forb Habitats [1]	Water Quality F=Flow T=Temp C=Clarity and Roadlessness [1]
Allen Gulch	L / H	H / H	H / H	H / H	H / H	L / L	H / H	H / H	L / H	L / H
Bybee Gulch	H / L	M / L	L / L	NA [1]	L / H	M / M		L / L	L / H	H / L C=H / H
Cedar Gulch	H / L	H / L	H / H	L / H	L / M	L / H		L / L	L / H	M / M
Chapman Creek	M / H	M / L	M / M	H / H	H / H	M / M	L / L	L / L	L / M	F=M / M T=M / H C=L / H
Chicago Creek	H / L	L / L	L / L	NA		L / H		H / M	L / M	F=H / L T=M / M C=L / H
Dunn Creek	H / H	H / L	H / H (by Sunstar)	H / H	M / H	M / M		H / H	L / H	F=M / M T=L / H C=M / M
East Fork below Chapman	L / H	L / L	M / M	H / H	H / H	L / L	L / L	L / L	L / L	L / H
Lower EF Illinois	L / H	H / L	H / H	H / H	H / H	L / L	H / H	M / L	M / M	L / H
East Fork; Scotch to Dunn	L / H	M / L	H / H	L / L		L / L		M / L	L / H	L / H
East Fork; Bybee to Chicago	H / L	M / L	L / L	NA		L / L		M / M	L / M	H / L
Upper East Fork	H / L	L / L	L / L	NA	H / L	H / L		H / H	L / M	H / L
Elder Creek	L / H	M / L	M / M	H / H	H / H	M / H		M / L	L / H	M / M C=L / H
Kelly Creek	H / H	L / L	M / M	H / H	H / H	M / M	L / L	L / L	L / L	L / H
Khoeery Creek	H / H	L / L	M / M	H / H	H / H	M / M		M / L	L / H	F=M / M T=M / H C=L / H

Table S-A-1: Resource Value Maintenance and Restoration Ratings										
Drainage Analysis Area	Critical Fish Habitat [1]	Cultural Resources [1]	Fire Hazard [1]	Forest Products [1]	Old Growth [1]	Large Wood Delivery Potential [1]	Rare Plants [1]	Recreation [1]	Savannas and Grass/forb Habitats [1]	Water Quality F=Flow T=Temp C=Clarity and Roadlessness [1]
Little Elder Creek	M / H	H / L	H / H	H / H	H / H	M / M	M / M	M / L	L / H M / M	M / M C=L / H
Long Gulch	L / H	M / L	H / H	NA	L / H	L / H		L / L	L / H	L / H
Page Creek	M / H	H / M	H / H	H / M	H / H	M / M		H / H	L / H	L / H C=L / M
Sanger Creek	H / L	L / L	L / L	NA	H / M	H / L		H / H	L / M	H / L
Scotch Gulch	H / M	H / H	H / H	M / M	L / H L / M	H / M	H / H	H / H	L / H M / H	L / H C=M / M
Tycer Creek	H / H	L / L	M / H	H / H	M / H	M / M	L / L	L / L	L / M	F=M / M T=L / H C=L / H

1. The first letter pertains to the priority of the need for maintenance of existing values. The second pertains to the priority for the need for restoration or improvement of the existing condition.
2. Late-Successional Reserves are not rated for their timber value; timber harvesting is not programmed to occur there.
3. Blank cells indicate unknown value.

Appendix B: Drainage Analysis Area Attribute Ranking

The different drainage area attributes that affect riparian conditions for tributaries to the East Fork Illinois River watershed are summarized in the following table. For convenience of making comparisons, the drainages are arranged into three "levels" based on the value of each attribute. Drainage rankings are independent of each other.

Table S-B-1: Drainage Analysis Area Attribute Ranking
(From Aquatic Module Table A-2)

Attribute	Higher levels	Middle	Lower levels
Watershed Area (mi^2)	Dunn Creek 25.8 Lower East Fork Illinois 8.45 Upper East Fork Illinois 7.5 Elder Creek 6.1 Kelly Creek 4.16 Chapman Gulch 3.97 EF Ill. (Bybee–Chicago) 3.80	Tycer Creek 3.73 Little Elder Creek 3.56 EF Illinois below Chapman 3.55 Page Creek 3.39 EF Illinois (Scotch - Dunn) 2.32 Khoeery Creek 2.68	Bybee Gulch 0.64 Cedar Gulch 1.14 Scotch Gulch 1.56 Long Gulch 1.64 Sanger Canyon 1.78 Allen Gulch 2.05 Chicago Creek 2.13
Stream Density (mi / mi^2)	Page Creek 7.5 Scotch Gulch 6.5 Tycer Creek 6.1 Cedar Gulch 5.7 EF Ill. (Scotch – Dunn) 5.7 Elder Creek 5.7 Kelly Creek 5.2	Dunn Creek 5.0 Chicago Creek 4.8 East Fork Ill (Bybee-Chicago)4.8 Long Gulch 4.7 Little Elder Creek 4.7 Chapman Creek 4.7	Lower EF Illinois 2.1 EF Ill. below Chapman. 3.0 Allen Gulch 3.4 Bybee Gulch 3.6 Khoeery Creek 3.8 Sanger Canyon 4.3 Upper East Fork Illinois 4.5
Road Miles w/in Riparian Reserve per stream mile	Allen Gulch 0.54 Khoeery Creek 0.38 Elder Creek 0.29 Long Gulch 0.29 Tycer Creek 0.28 Lower EF Illinois 0.25 Chapman Creek 0.25 Chicago Creek 0.25	East Frk Ill below Chapman 0.24 Cedar Gulch 0.22 Little Elder Creek 0.21 Scotch Gulch 0.21 Kelly Creek 0.20	Bybee Gulch 0 Upper East Fork Illinois 0.03 EF Ill(Bybee–Chicago) 0.05 Sanger Canyon 0.08 Page Creek 0.12 Dunn Creek 0.17 EF Ill. (Scotch - Dunn) 0.19
Road crossings per stream mile	Khoeery Creek 3.14 Tycer Creek 2.66 Allen Gulch 1.71 Kelly Creek 1.56 EF Ill. below Chapman. 1.50 EF Ill. (Scotch – Dunn) 1.50 Chapman Creek 1.47	Lower EF Illinois 1.24 Elder Creek 1.04 Long Gulch 0.91 Little Elder Creek 0.89 Chicago Creek 0.78 Cedar Gulch 0.77	Upper EF Illinois 0.03 EF Ill.(Bybee–Chicago)0.11 Sanger Canyon 0.26 Scotch Gulch 0.30 Bybee Gulch 0.44 Page Creek 0.51 Dunn Creek 0.56
Rd Density [a] (mi / mi^2)	EF Illinois below Chapman. 5.3 Khoeery Creek 5.3 Lower EF Illinois 4.9 EF Ill. (Scotch – Dunn) 4.9 Chapman Creek 4.8 Allen Gulch 4.8 Tycer Creek 4.2	Kelly Creek 3.8 Elder Creek 3.8 Chicago Creek 3.4 EF Ill. (Bybee–Chicago) 2.6 Long Gulch 2.4 Little Elder Creek 2.4	Upper EF Illinois 0.26 Sanger Canyon 0.5 Page Creek 1.2 Cedar Gulch 1.6 Dunn Creek 2.0 Bybee Gulch 2.0 Scotch Gulch 2.2
% RR affected by Mgmt. [b]	Long Gulch 100 Elder Creek 48 Little Elder Creek 43	Cedar Gulch 40 Chicago Creek 38 Scotch Gulch 32 Dunn Creek 31	Upper EF Illinois 5 Sanger Canyon 23 Page Creek 25 Bybee Gulch 25

Attribute	Higher levels	Middle	Lower levels
[c] % RR in Mature to Old Growth seral stage (PMR 1988)	EF Illinois below Chapman 89 Chapman Creek 85 Page Creek 61 Little Elder Creek 54 Kelly Creek 53 Upper EF Illinois 52 Khoeery Creek 52	Elder Creek 44 Dunn Creek 42 Scotch Gulch 42 Allen Gulch 39 Chicago Creek 36 Sanger Canyon 27 Tycer Creek 27	EF Ill. (Scotch – Dunn) 0 Cedar Gulch 7 Bybee Gulch 13 Lower EF Illinois 22
[c] %RR in serpentine / ultramaphic	Khoeery Creek 48 Scotch Gulch 36 Upper EF Illinois 29 Sanger Canyon 27 Bybee Gulch 27 Tycer Creek 23	Dunn Creek 22 Little Elder Creek 20 Elder Creek 16 Chicago Creek 11 Lower EF Illinois 10 Cedar Gulch 5	Kelly Creek 0 EF Illinois below Chapman 0 Allen Gulch 0 EF Ill. (Scotch – Dunn) 0 Chapman Creek 0.5 Page Creek 2
[d] %RR in risk of potential natural failure	Chicago Creek 38 Upper EF Illinois 23		Bybee Gulch 6 Dunn Creek 7 Sanger Canyon 9

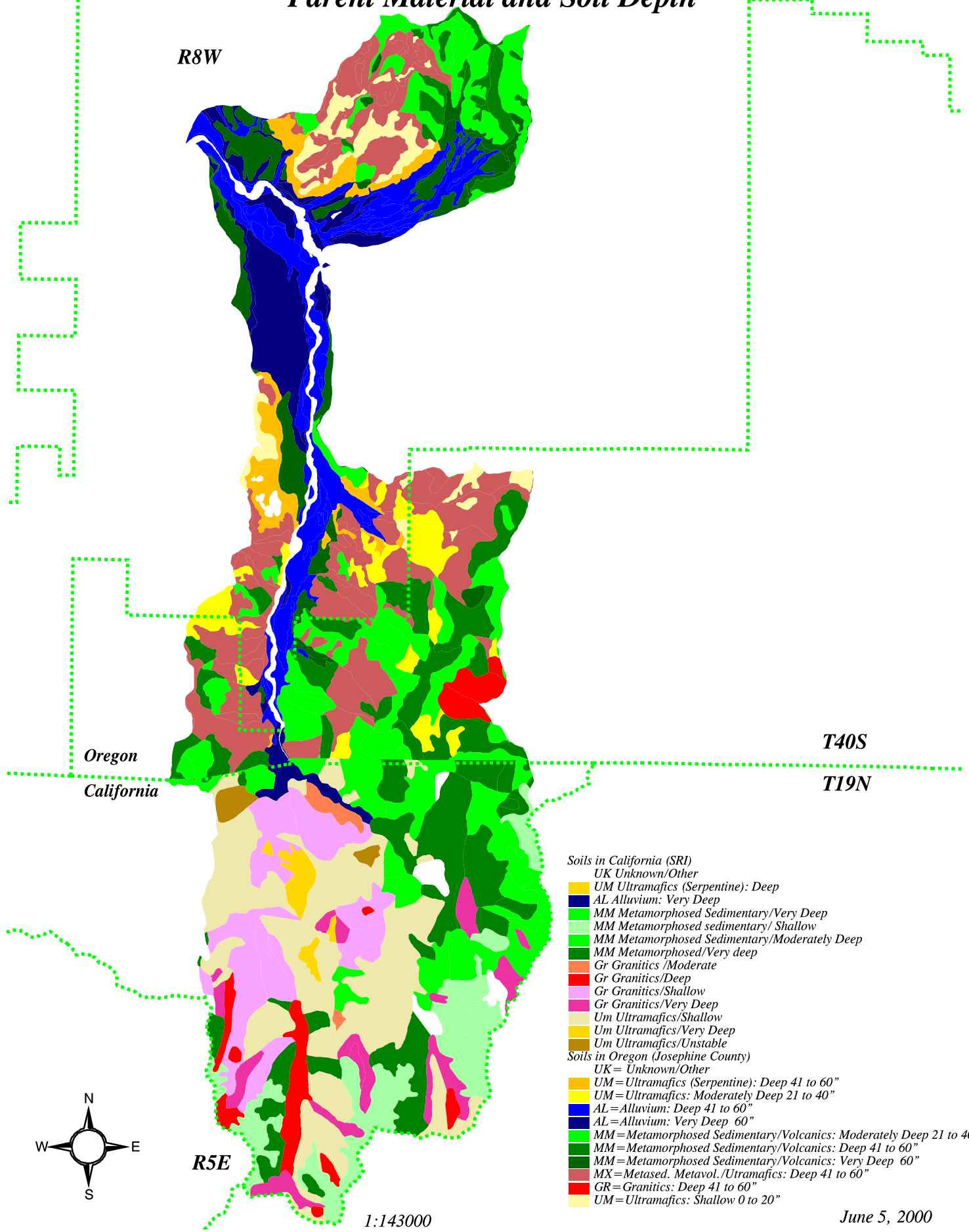
[a] Road mileage and densities based on GIS data. Road mileage and density for analysis areas outside National Forest lands were calculated with BLM GIS maps containing BLM and non-BLM roads.

[b] For analysis areas outside National Forest lands, the percent affected by management is a DATAGAP, though much of the areas have been affected by historic mining.

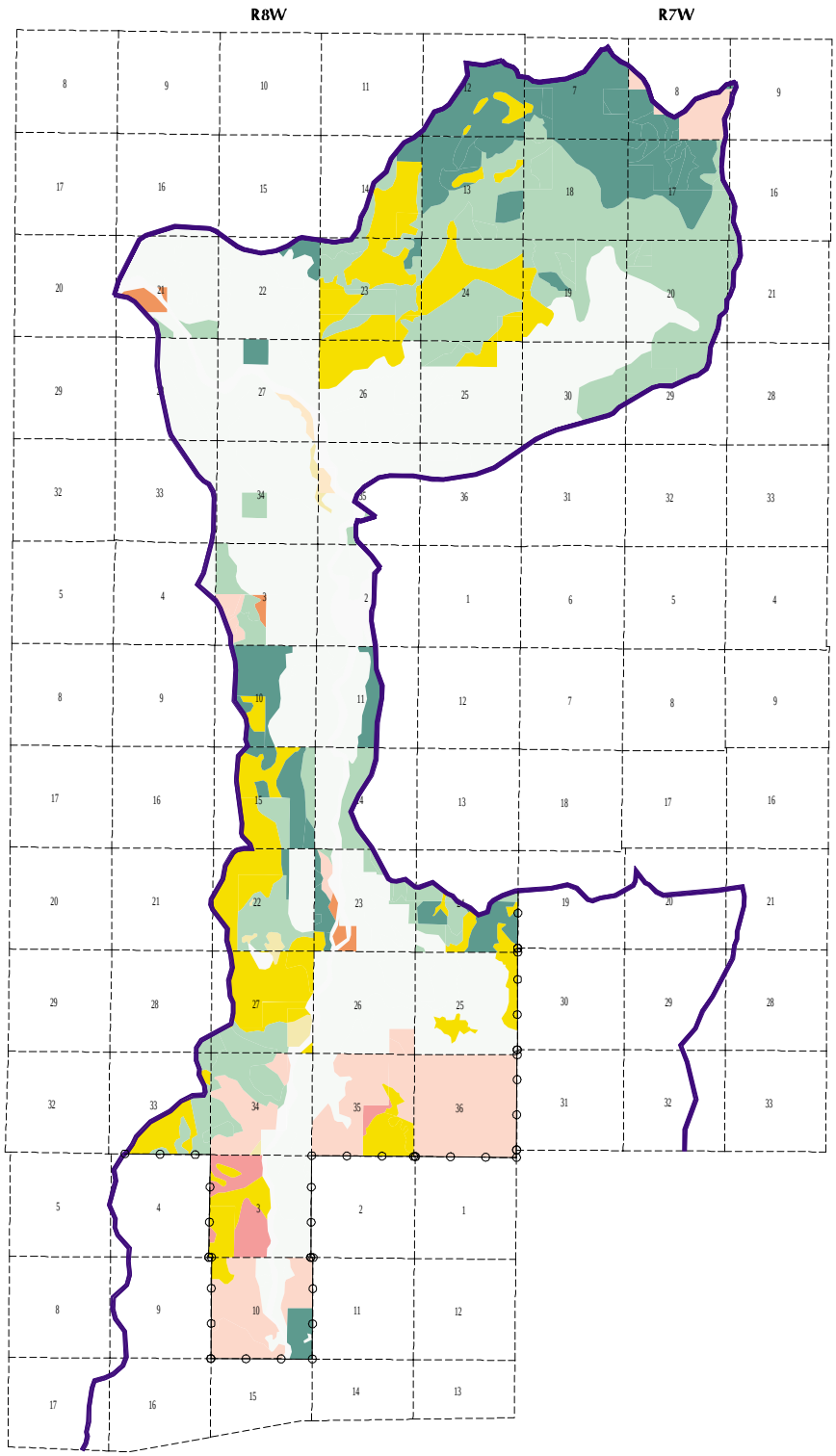
[c] DATAGAP for EF Illinois Bybee to Chicago and for Long Gulch.

[d] Potential natural failure includes RR area in granitics / unstable soil, slopes >55%, and in transient snow zone. No BLM lands exist in this watershed that meets this criteria.

East Fork Illinois Watershed
Parent Material and Soil Depth



June 5, 2000



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PLANT SERIES
ON LANDS OUTSIDE THE USFS BOUNDARY
IN THE EAST ILLINOIS WATERSHED

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

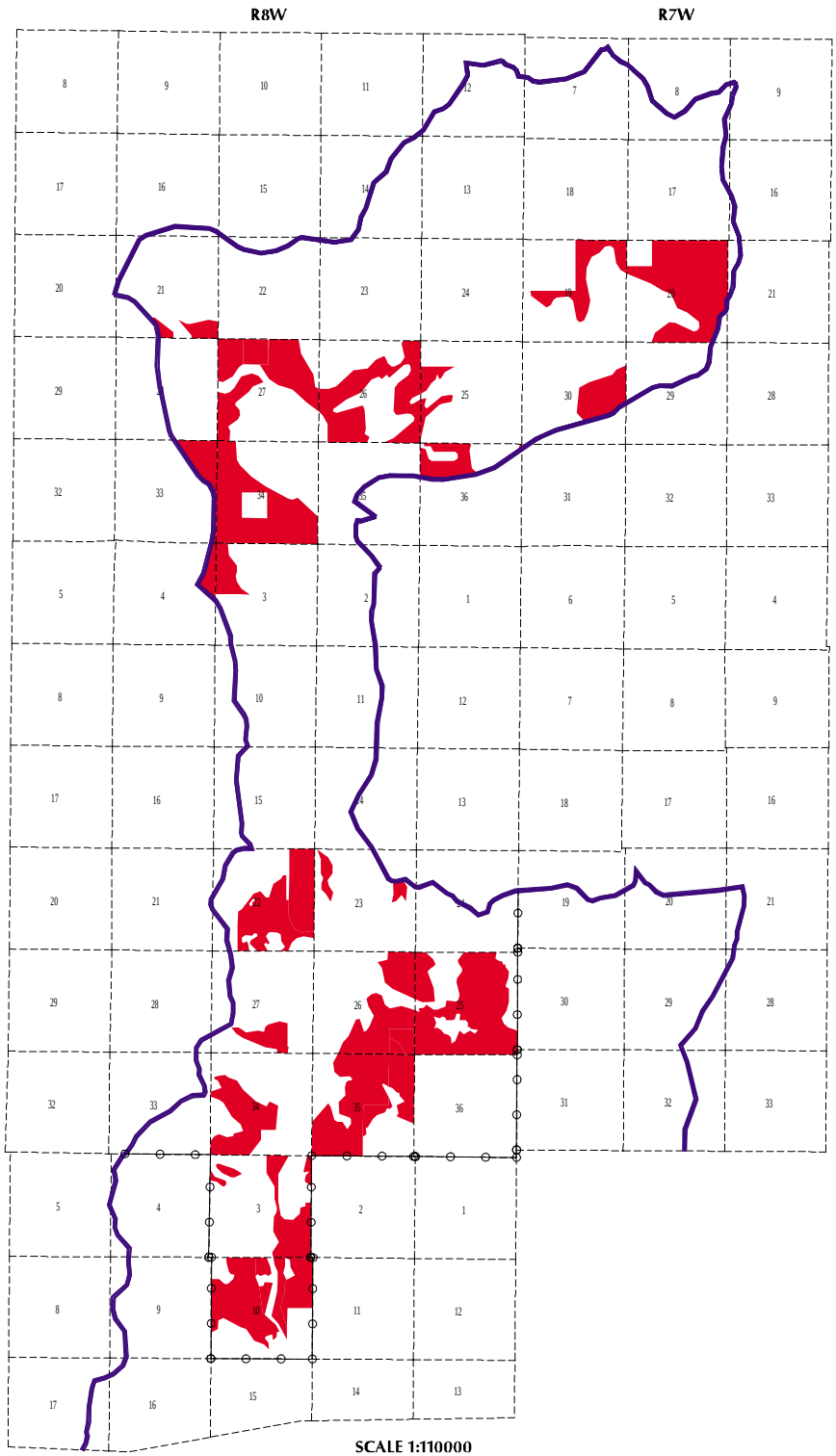
August 1999

John McGlothlin

LEGEND

- NON-VEG.
- NON-FOREST
- RIPARIAN HARDWOOD
- TANOAK
- TANOAK/ D.FIR
- W.OAK
- J.PINE
- P.PINE
- D.FIR/ PINE
- D.FIR
- WATERSHED BOUNDARY
- USFS BOUNDARY

N



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POTENTIAL HIGH PRIORITY HAZARD REDUCTION TREATMENT AREAS OUTSIDE THE USFS BOUNDARY IN THE EAST ILLINOIS WATERSHED

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

August 1999

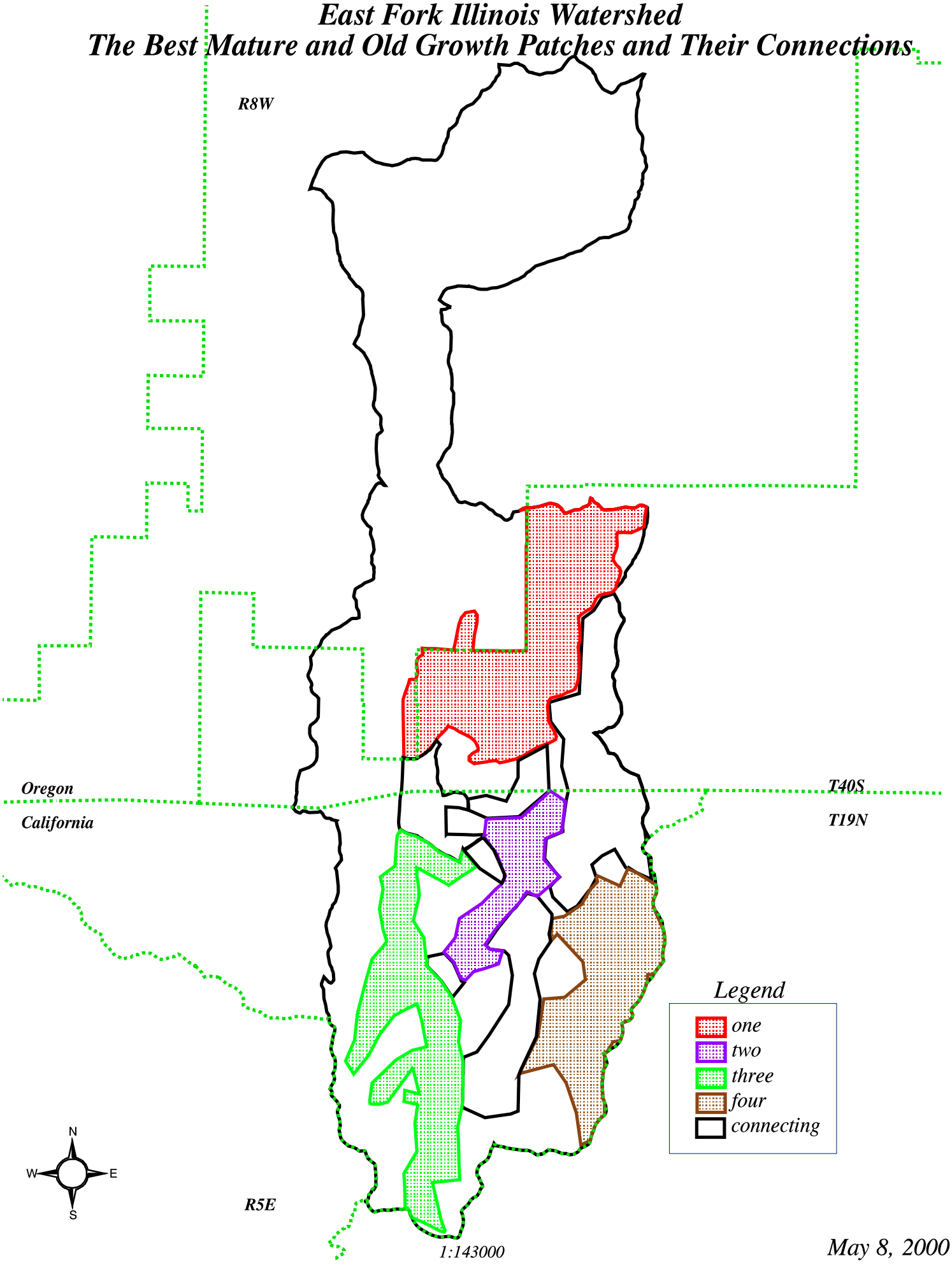
John McGlothlin

LEGEND

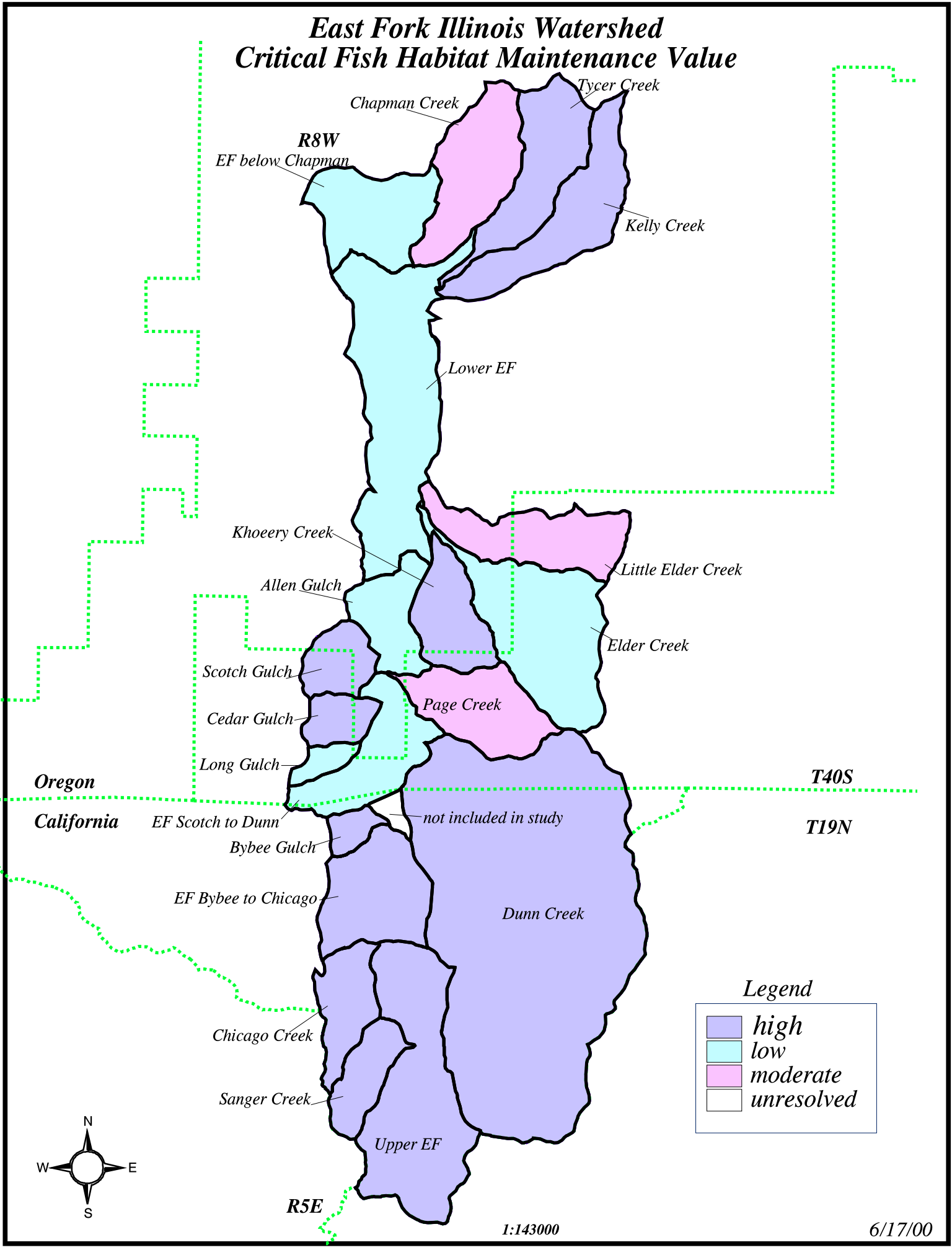
- Areas With High Ratings
- WATERSHED BOUNDARY
- USFS BOUNDARY

N

East Fork Illinois Watershed
The Best Mature and Old Growth Patches and Their Connections



East Fork Illinois Watershed
Critical Fish Habitat Maintenance Value



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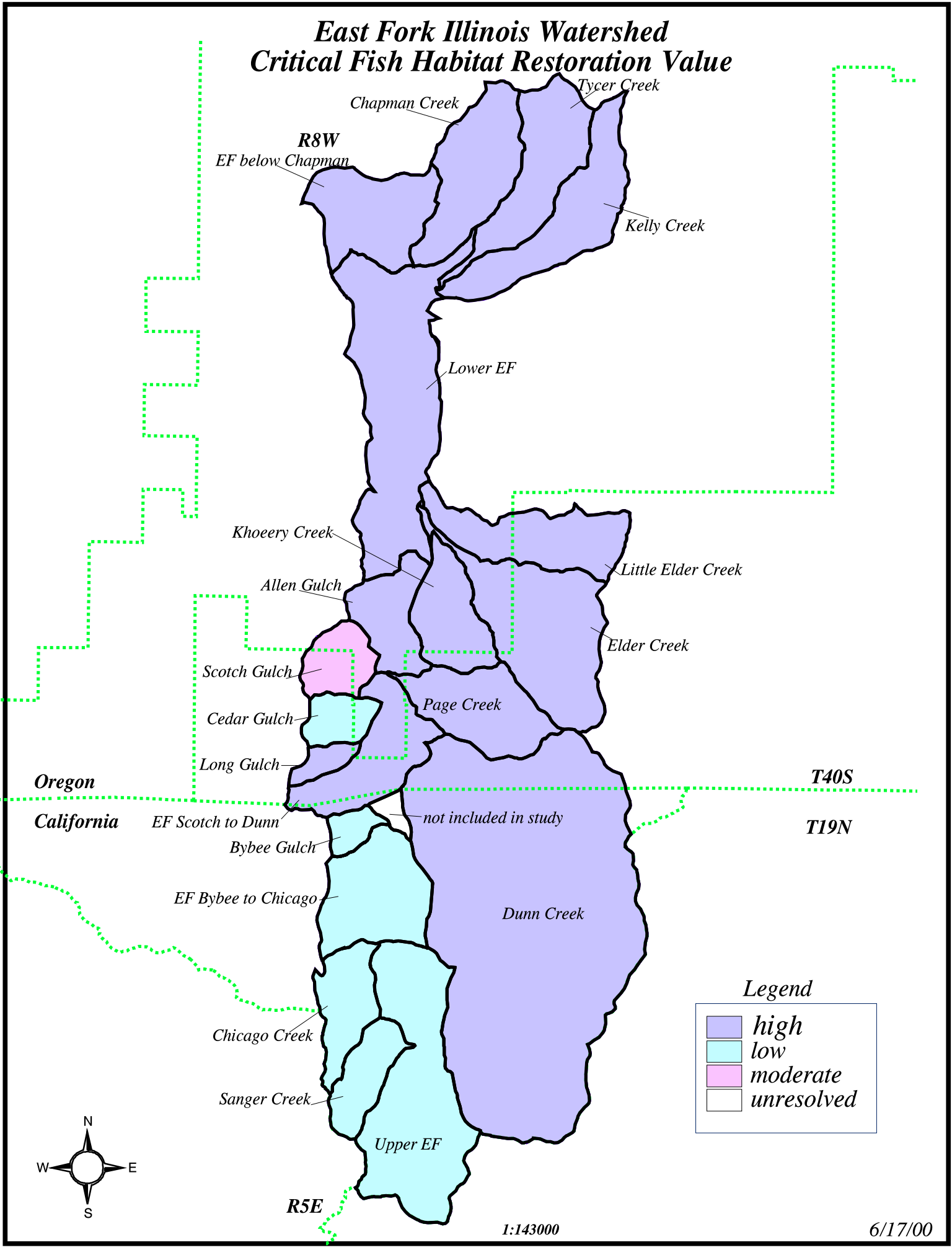
East Fork Illinois Watershed
Critical Fish Habitat Restoration Value



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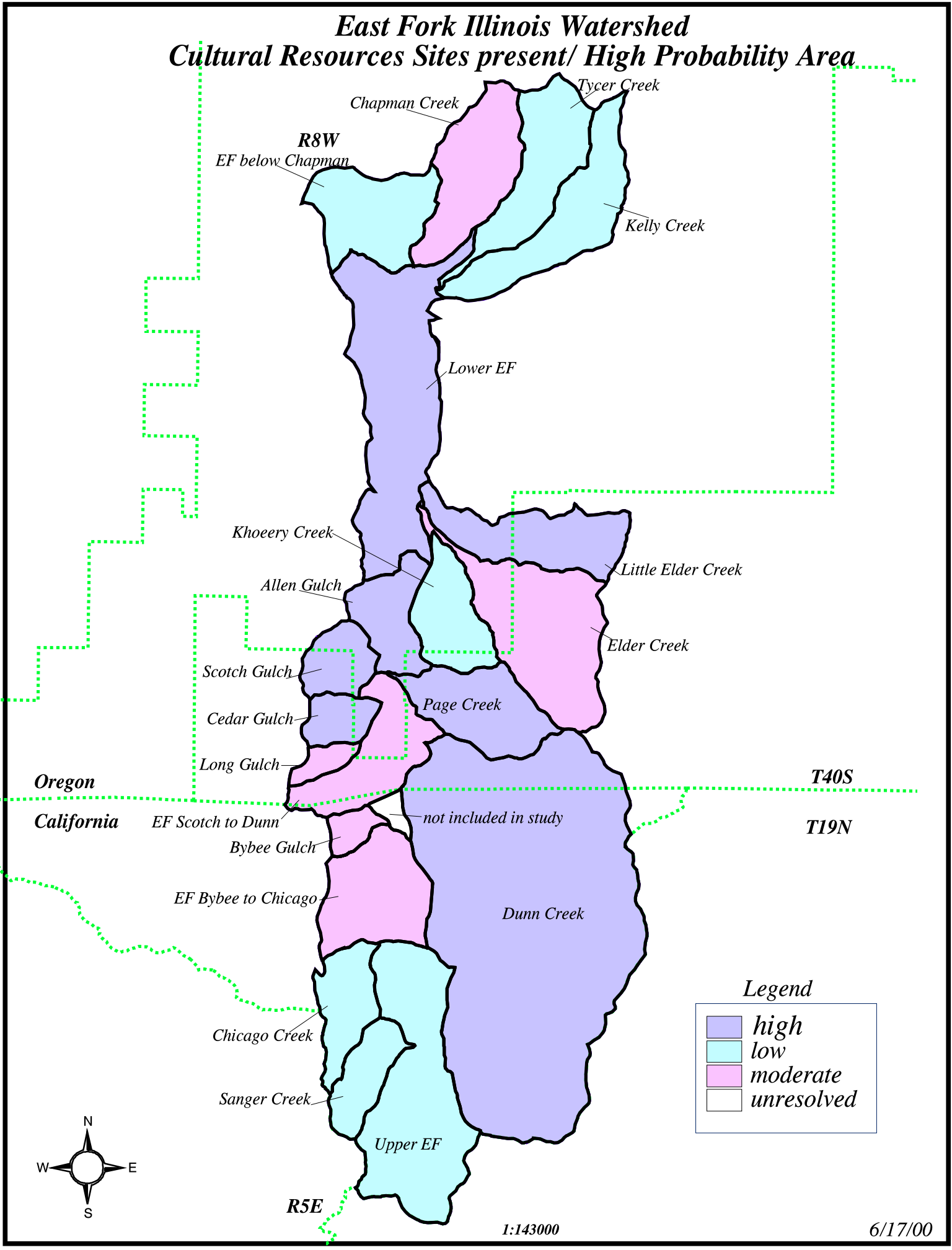
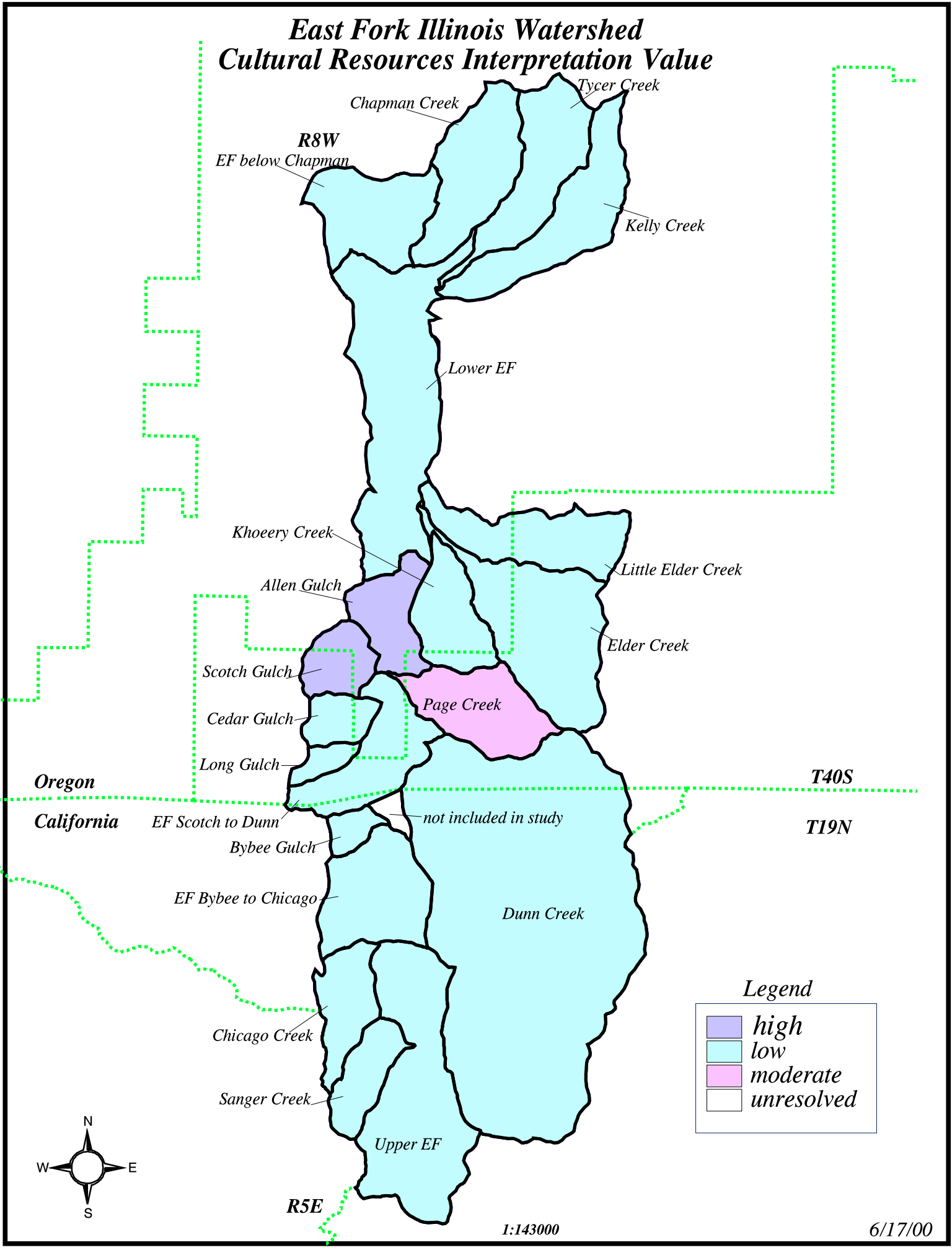
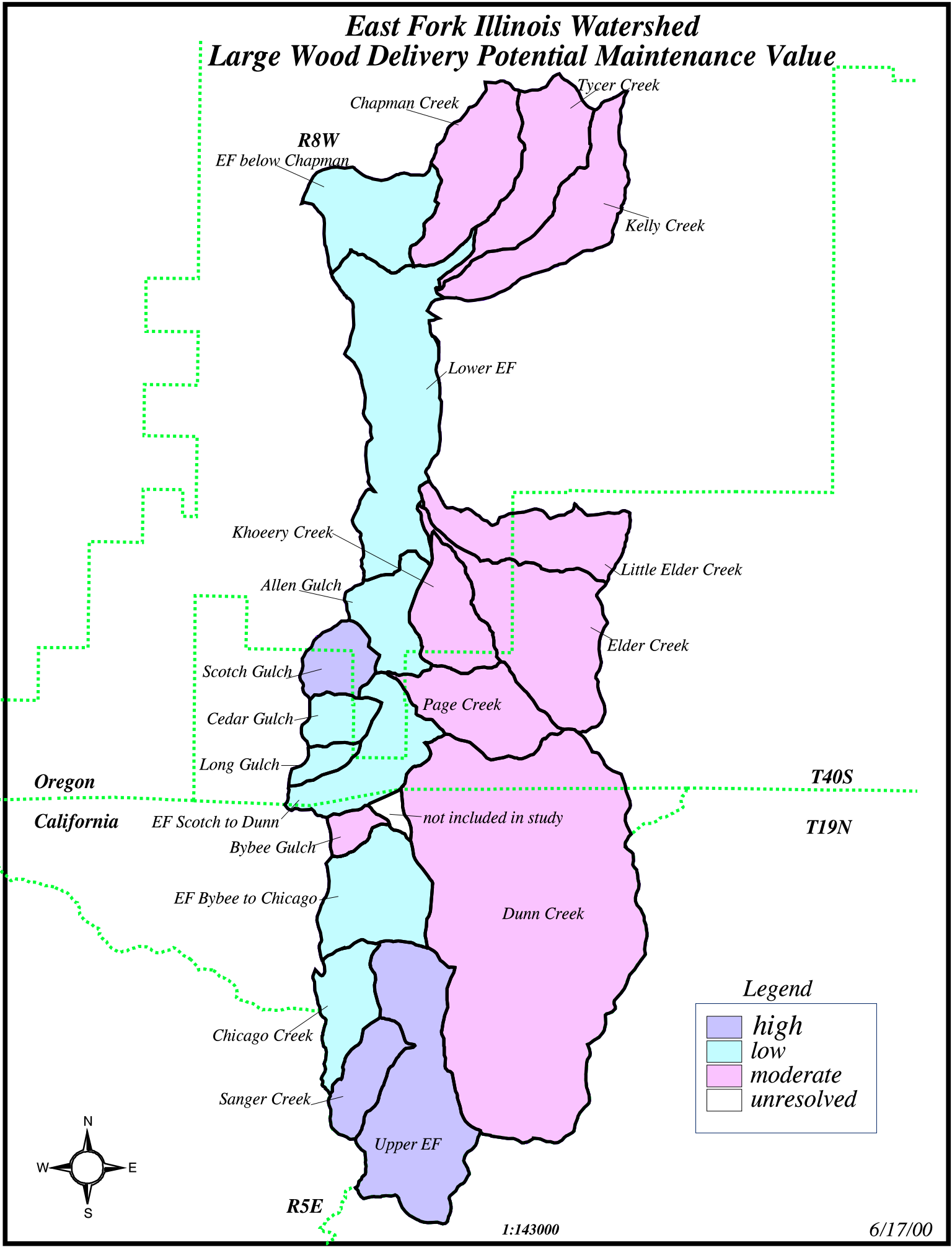
East Fork Illinois Watershed
Cultural Resources Sites present/ High Probability Area



East Fork Illinois Watershed
Cultural Resources Interpretation Value



East Fork Illinois Watershed
Large Wood Delivery Potential Maintenance Value



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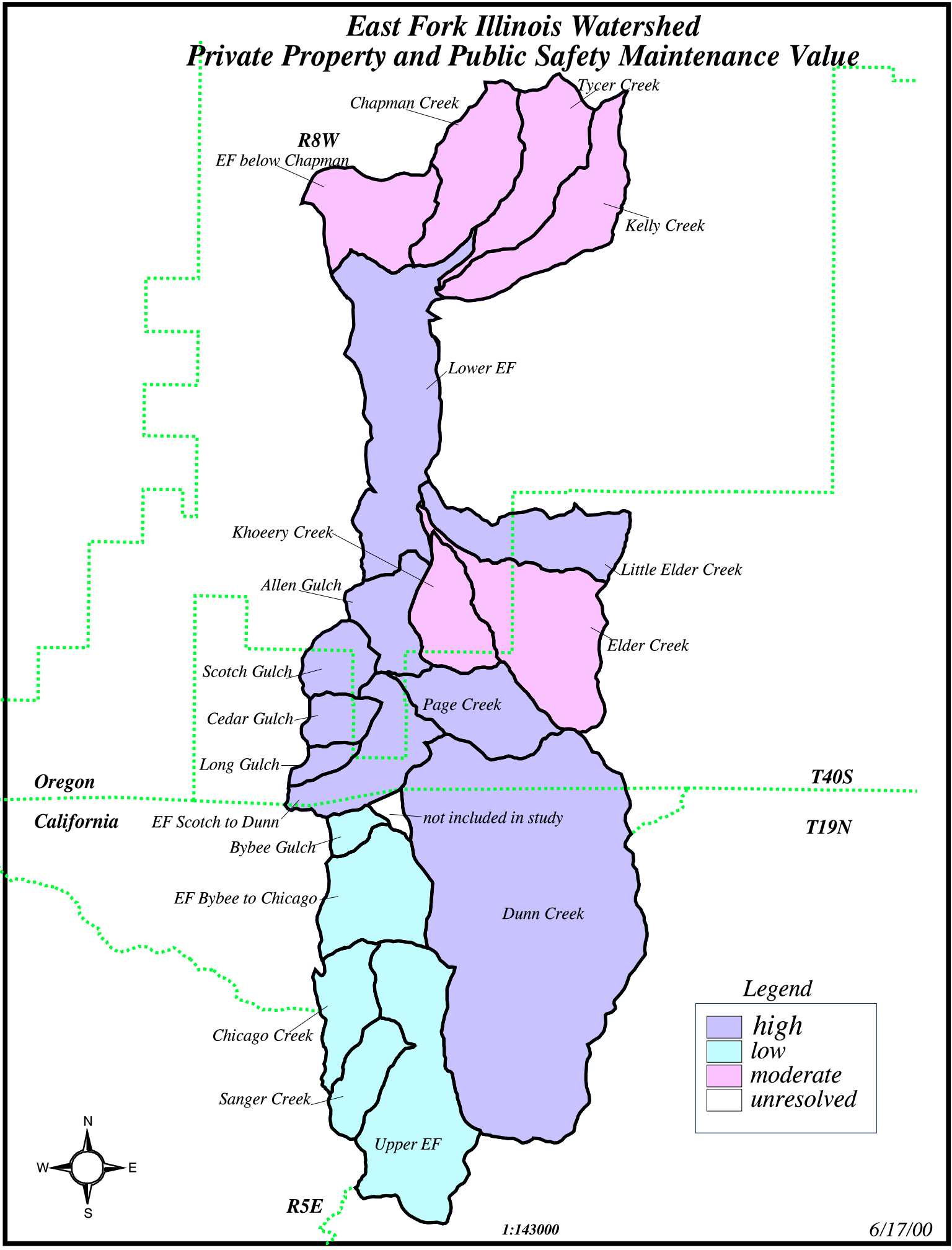
East Fork Illinois Watershed
Private Property and Public Safety Maintenance Value



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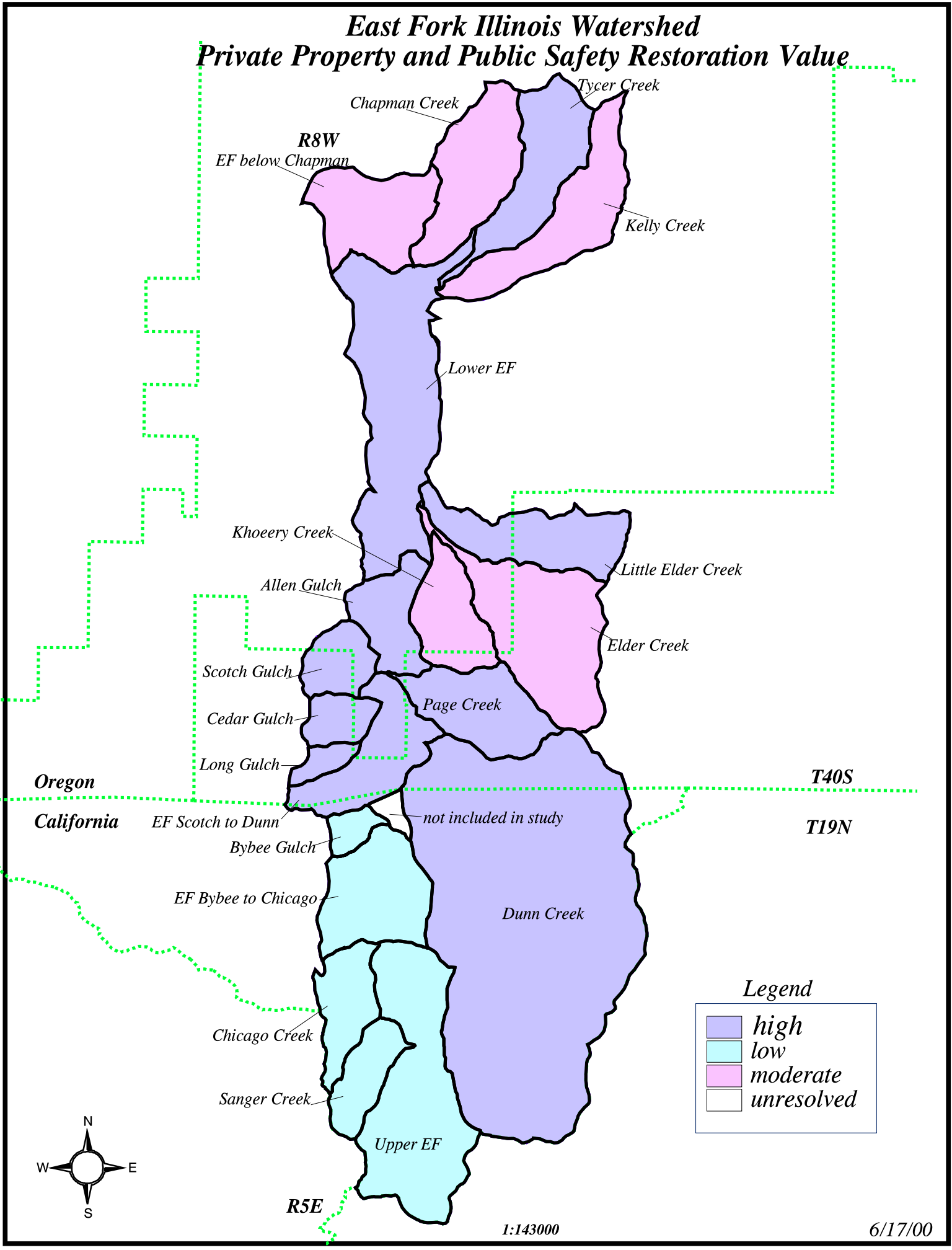
East Fork Illinois Watershed
Private Property and Public Safety Restoration Value



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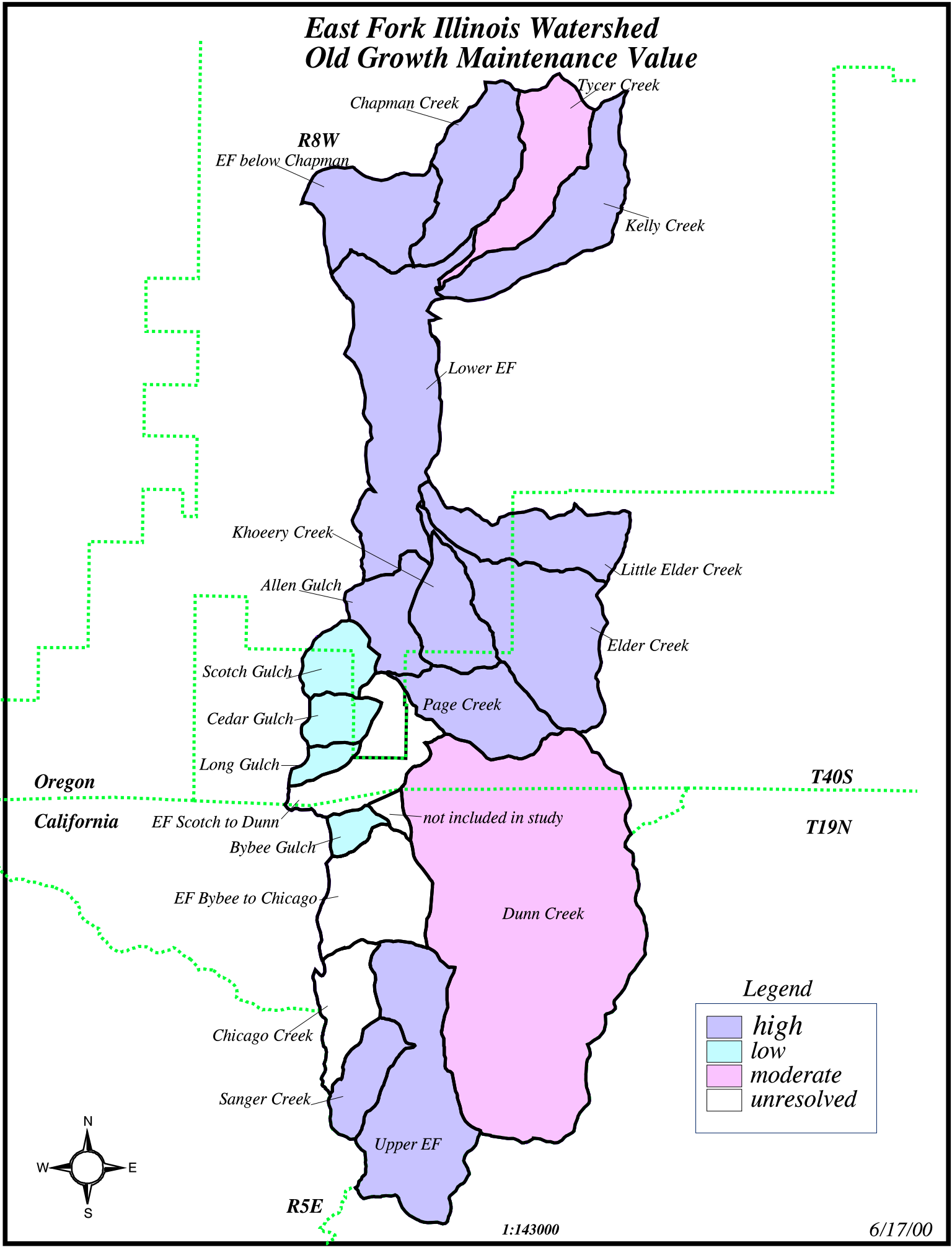
Old Growth Maintenance Value



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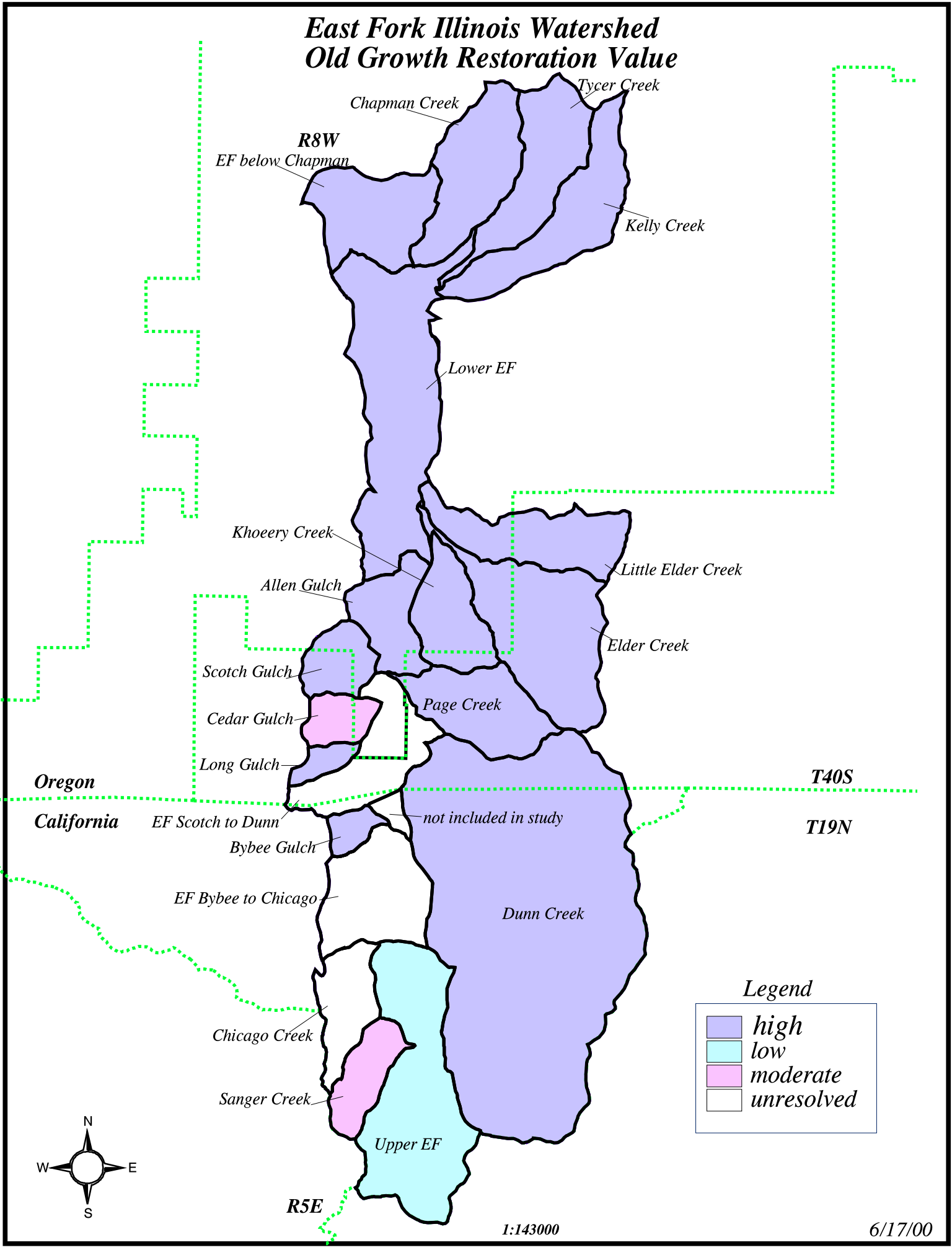
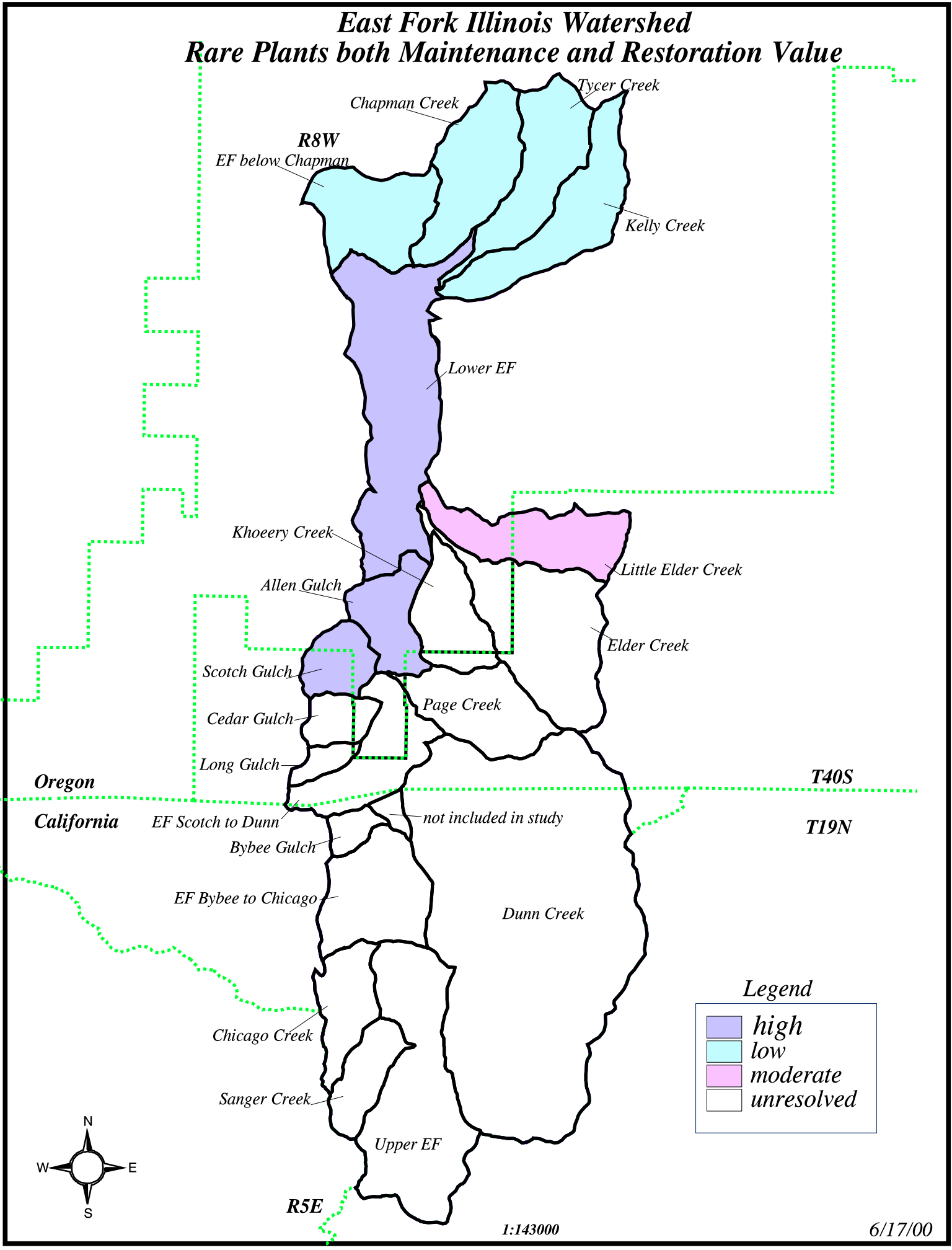
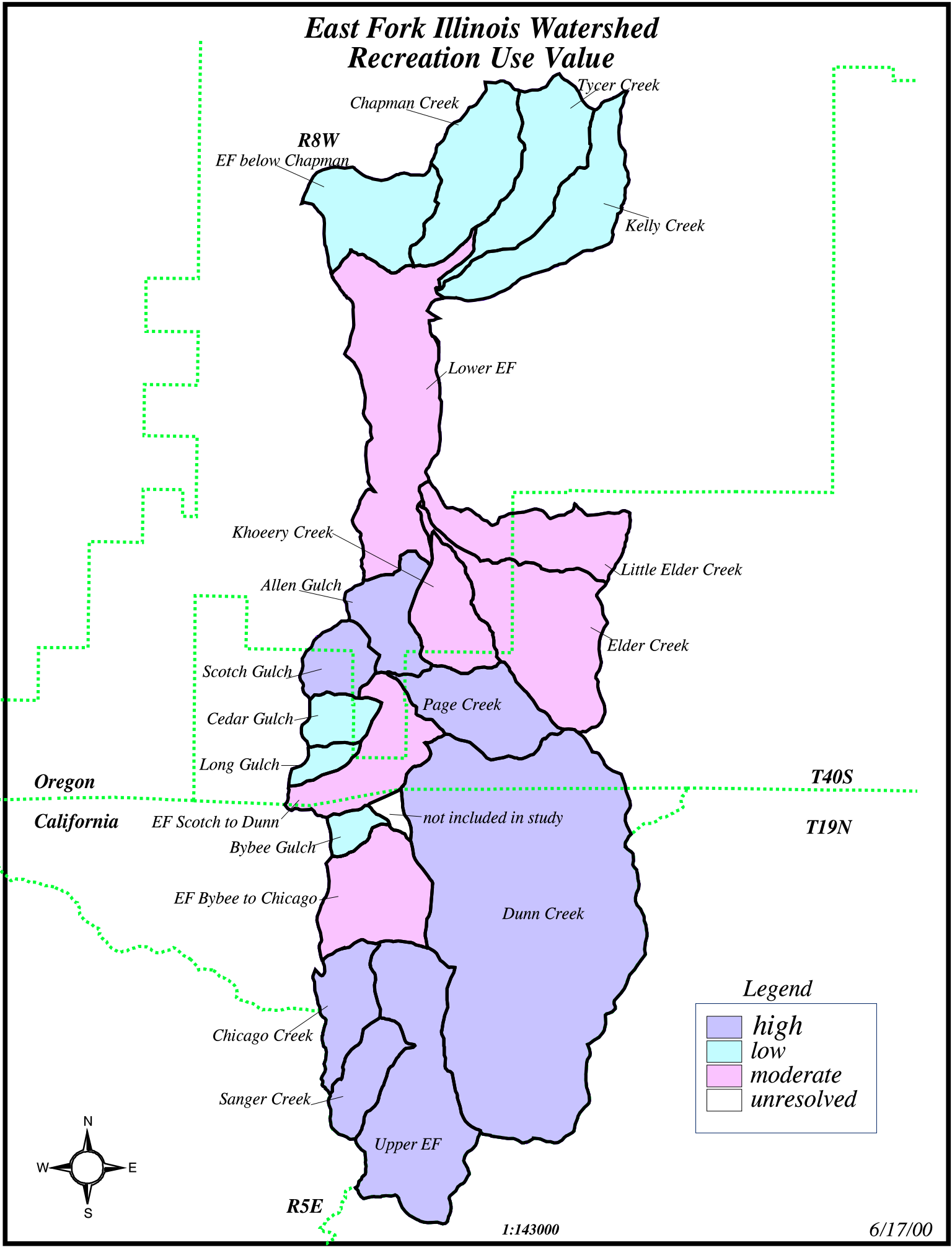
Old Growth Restoration Value



East Fork Illinois Watershed
Rare Plants both Maintenance and Restoration Value



East Fork Illinois Watershed
Recreation Use Value



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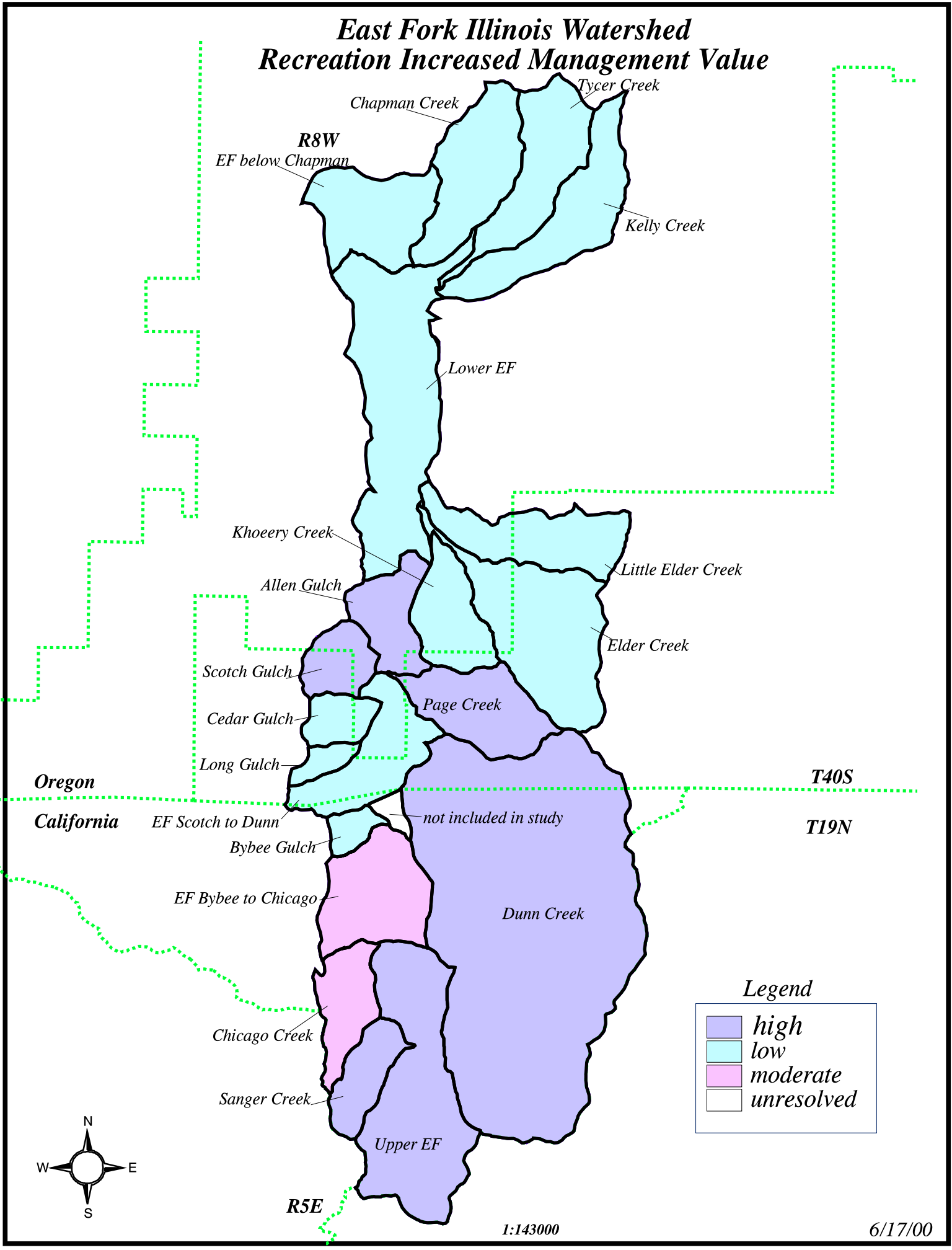
Recreation Increased Management Value



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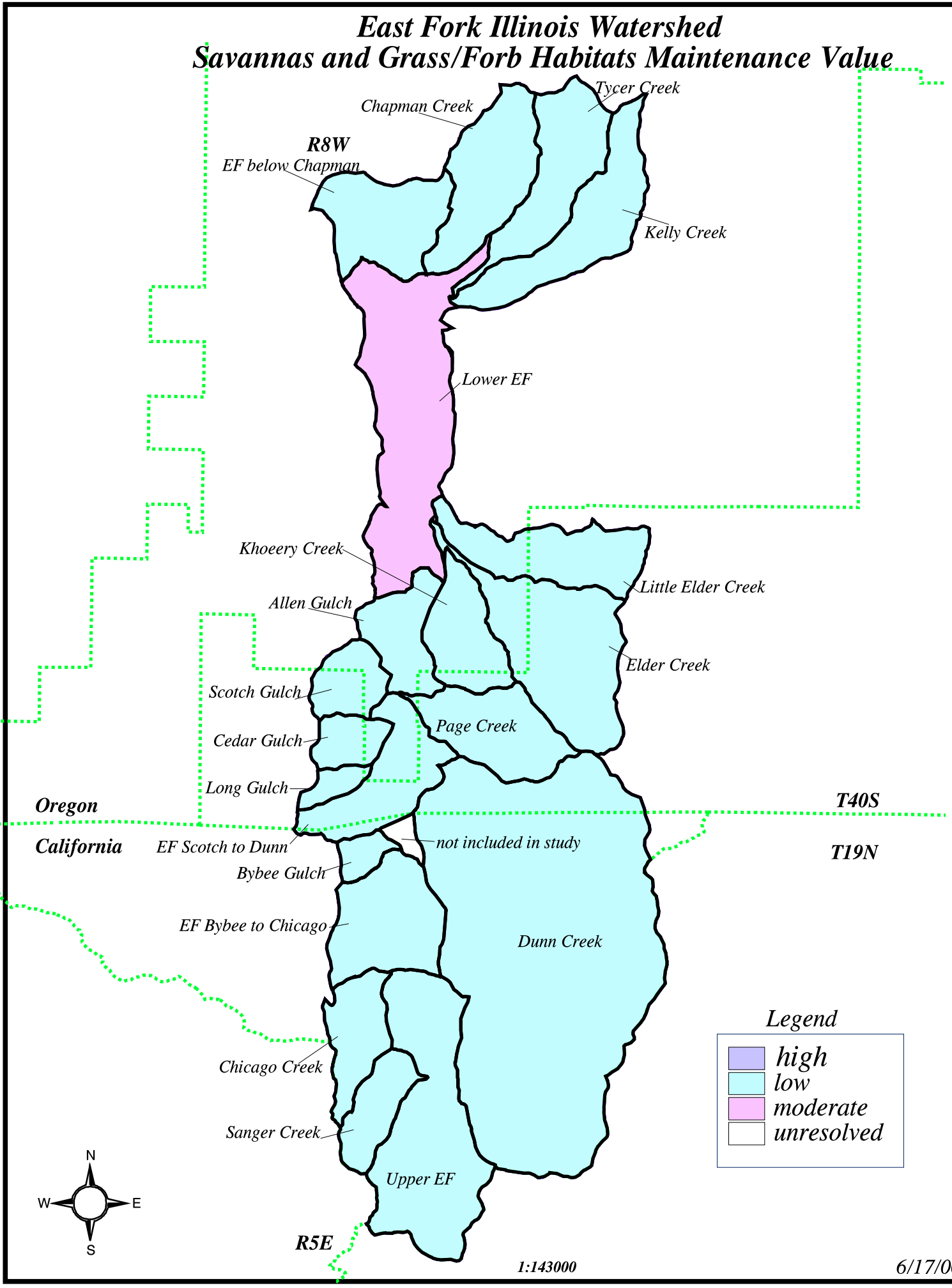
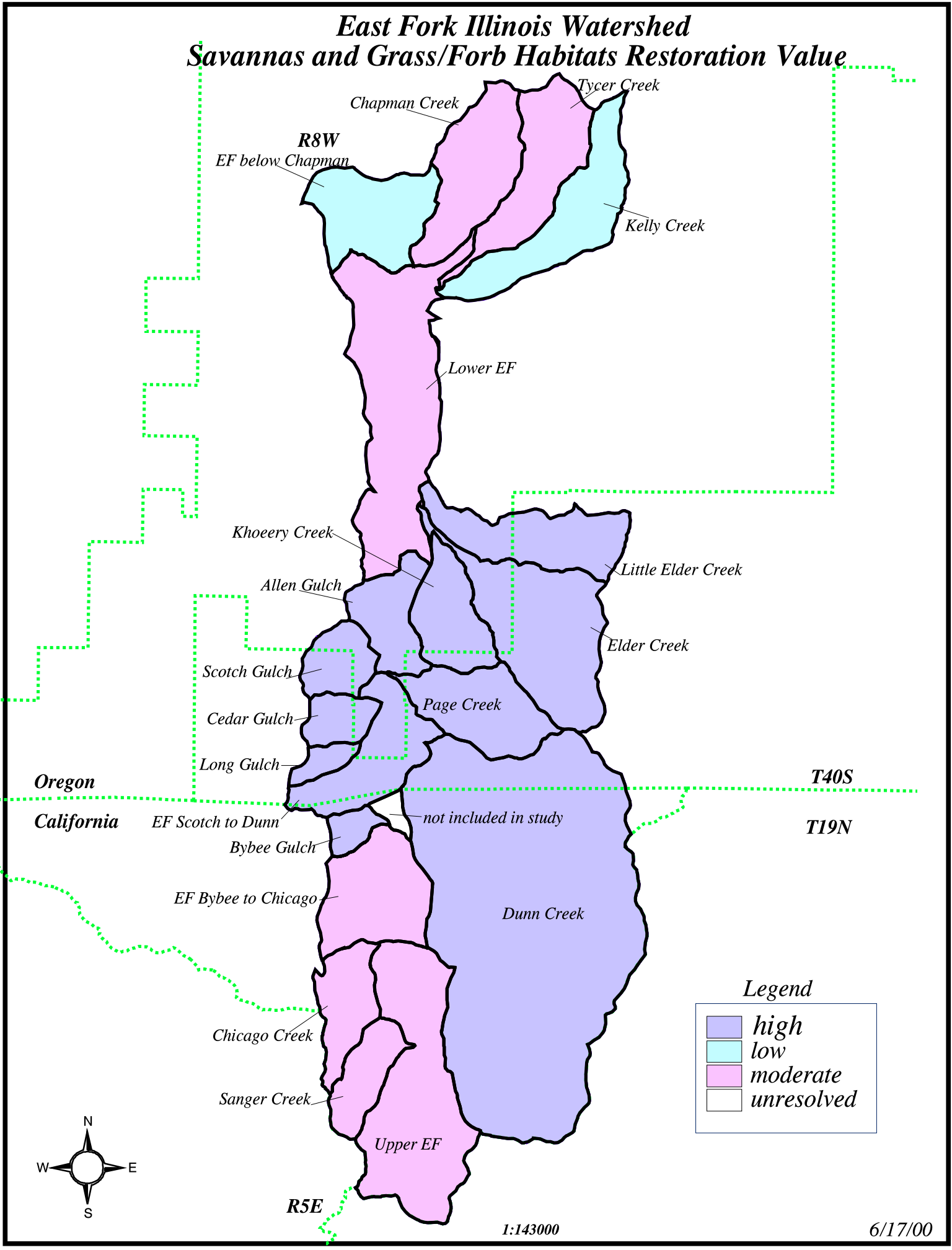
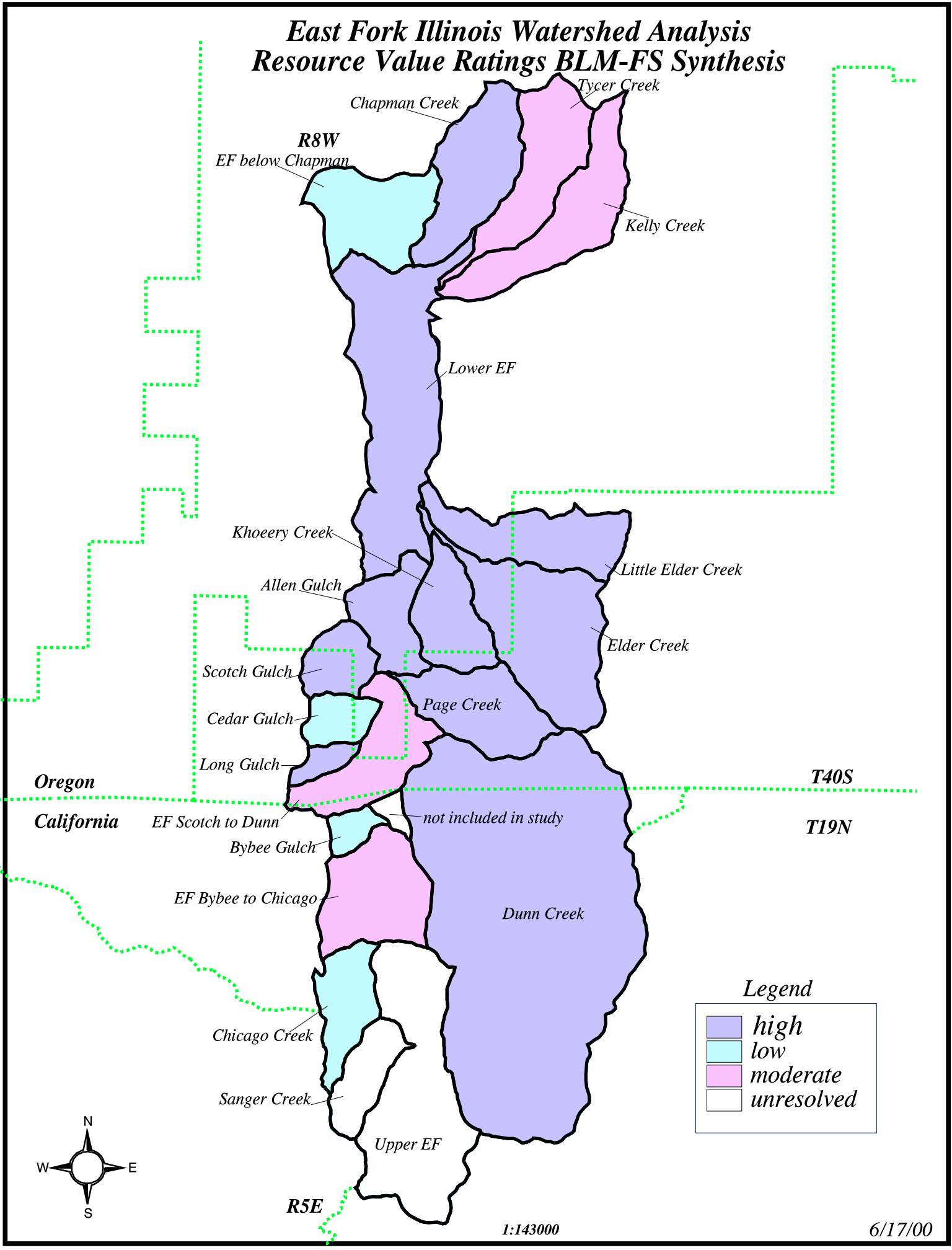
East Fork Illinois Watershed
Savannas and Grass/Forb Habitats Maintenance Value



East Fork Illinois Watershed
Savannas and Grass/Forb Habitats Restoration Value



East Fork Illinois Watershed Analysis
Resource Value Ratings BLM-FS Synthesis



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East Fork Watershed Analysis
Plant Series