

# A Review of the Size of Forest Holding/Parcelization Problem in Family Forest Literature



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# Importance of Family Forests: Butler (2008)

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- ❧ There are about 11.3 million private forest owners in the United States.
- ❧ About 10.4 million of them are family forest owners.
- ❧ These family forest owners control 62% of the nation's private forest land.
- ❧ In the recent past these ownerships were generally called nonindustrial private forests (NIPFs) .
- ❧ Over the last few decades much of the forest industry timberland has shifted ownership to NIPF owners requiring a shift in definition.
- ❧ Butler (2008) classified private forestland owners as industrial, other non-industrial, and family forest.

# Two Definitions



- ❧ **Nonindustrial private forest owners** – Family and individuals who own forest land and corporations and other private groups that own forest land, but do not own and operate a primary wood-processing facility. This group is a subset of private forest owners.
- ❧ **Family forest owners** – Families, individuals, trusts, estates, family partnerships, and other unincorporated groups of individuals that own forest land. This group is a subset of nonindustrial private forest owners.

# The Small Forest or NIPF Problem

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- ⌘ Emerged early in the twentieth century when NIPF or family forest owners were seen to manage their lands in a suboptimal manner resulting in low forest productivity relative to other ownership groups.
- ⌘ Many believed that poor forest management on these NIPF ownerships would lead to future timber supply problems.

# Problem Surfaces Early 20<sup>th</sup> Century

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- ❧ This prompted forest policymakers to research the issue.
- ❧ The Capper Report (1920)
  - Found “the kernel of the problem lies in the enormous areas of forest land which are not producing the timber crops that they should.”
  - This urged legislation “which will permit effective cooperation between the Federal Government and the several states in preventing forest fires and growing timber on cut-over lands.”

# Public Regulation or Cooperation?

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- ❧ The U.S. Congress settled the argument with the passage of the Clarke-McNary Act in 1924 that authorized federal-state cooperation in
  - Forest fire protection
  - Tree Planting
  - Forestry Extension

# Public Regulation or Cooperation?

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- ❧ A second major USDA Forest Service report in 1933, the Copeland Report
  - Continued to stress timber depletion and exploitation by the private forest owners
  - Suggested state-federal cooperation and public aid to private forest owners to encourage rational forest management.

# A Continuing Problem



- ❧ By mid-century, small forest owners were identified as “the heart of the problem.”
- ❧ Key concerns were
  - Lack of technical knowledge by forest owners
  - The problem of small average tract size.
- ❧ Gradually the NIPF problem was more thoroughly researched and the conventional view changed from one of imminent timber supply problems to
  - NIPF owner motivations,
  - Rational behavior,
  - Economic expectations.

# Early Recognition of the Problem: Stoddard (1942)

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- ❧ Examined the cut-over forest area of Northern Wisconsin that followed a pattern of being sold off in small parcels after an area had been logged, resulting in tracts too small for efficient forest management.
- ❧ He found most owners of small forest holdings lacked an interest in long-term forestry and were not actively managing their properties.
- ❧ Specifically listed “size of holdings” as a management issue.
- ❧ The small size caused managerial issues, harvesting efficiency issues, and marketing issues.
- ❧ Size of forest holding as a problem was mentioned as a minor issue.

# Early NIPF research classified by research study objectives



1. NIPF ownership characteristics.
2. NIPF ownership characteristics and related ownership practices.
3. Methodology of conducting ownership studies.
4. General problems of promoting management on NIPF holdings.
5. Economic analysis of production problems on NIPF holdings.
6. Marketing products from NIPF holdings.

# A Side Issue



- ❧ Size of forest holding arose as a side issue in these early NIPF studies. Rarely was it mentioned as having broad implications, but usually as one of many problems.
  
- ❧ The early studies focused on NIPF landowner characteristics like
  - Occupation,
  - Education,
  - Gender,
  - Management objectives,
  - Income level,
  - Asset level,
  - Land tenure.

# NIPF Owner Characteristics



- ❧ These studies often gathered data on average tract size, but rarely discussed implications.
- ❧ Studies that tied characteristics to actual management practice rarely emphasized physical tract characteristics, but focused on forest owner characteristics.
- ❧ Once researchers had studied owner characteristics and pine stocking indexes, some focus on the small forests developed.

# Early Study by Stoddard is a Good Example

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- ❧ It was a simple survey of characteristics like tract size, length of ownership, how the land was acquired, ownership objective, owner attitude towards public assistance , and ownership pattern.
- ❧ It described the owners and their forest holdings, but made little attempt to establish relationships with forest management practices on the land.

# Promoting Management on NIPF Holdings

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- ❧ How American forest management on small forest holdings compared to that in European countries, especially Sweden, became a research topic.
- ❧ Some studies considered economic aspects of small forests , suggesting education and demonstration programs or technical assistance as a means to encourage forest management.

# Promoting Management on NIPF Holdings

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- ❧ The fundamental question was what actually motivated NIPF owners to produce timber.
- ❧ While the NIPF problem was generally accepted, occasionally, the linkage between NIPF forest holdings and potential timber supply problems was questioned by some researchers.

# Promoting Management (1960's)

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- ❧ One general issue surfaced that still claims importance. Size of forest holding limits the economies of scale available to a forest owner to attain economic efficiency in the establishment, management, and harvesting of timber.
- ❧ In addition, size of forest holding was shown to be closely correlated with the forest owner's asset position. This affects their availability of capital to invest in and manage forest land .

# Promoting Management (1960's)

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- ❧ A classic study in Sweden (Streyffert, 1957), and other studies in the United States, focused on the effects of tract size on operating efficiency and profitability.
- ❧ The most recent NIPF studies and reports continue to examine this variable.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior



- ❧ The literature on size of forest holding is extensive but mostly hidden within the hundreds of NIPF research studies.
- ❧ There are a few literature reviews on the NIPF literature, but only a couple address size of forest holding as a main topic. Cubbage (1983) and Royer (1980) are good examples.
- ❧ Butler (2008) did an excellent job of summarizing ten of the primary influences and tying them to current data.

# Promoting Management: Cubbage (1983)

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- ☞ Surveyed the theoretical bases of economics of size studies and reviewed the forestry literature on economics of size.
- ☞ Listed “tract size” as an important variable for determining average harvest costs.
- ☞ The spreading of initial fixed costs for moving up a harvest system are the primary causes for economies of size.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Royer (1980)

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- ❧ Examined the dependent variables used to judge landowner performance, the independent variables that determined landowner behavior, and how these related to timber supply from 50 years of small woodland owner studies.
- ❧ He concluded:
  - ❧ These early studies might have been misleading to forest policymakers.
  - ❧ The NIPF studies tended to use dependent variables derived from “publically desirable” rather than “individually rational” performance standards.
  - ❧ Many studies identified “psychogenic determinants” of forest landowner behavior, rather than the more important “sociogenic determinants”.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



❧ **Land Tenure:** As size of forest holding increases, length of land tenure increases.

- Folweiler, A.D., and Vaux, H.J. 1944. Private forest landownership and management in the loblolly shortleaf pine type in Louisiana. *J. For.* 42:783-790.
- James, L.M., Hoffman, W.P., and Payne, M.A. 1951. *Private Forest Landownership and Management in Central Mississippi* (Technical Bulletin 33). State College, MS: Mississippi Agricultural Experiment Station.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



∞ **Land Transfers:** As size of forest holding increases, transferred forestland increases.

- Worley, D.P. 1960. *The Small Woodland Owner in Eastern Kentucky: His Attitudes and Environment* (Technical Paper 175). Columbus, OH: USDA Forest Service, Central States Forest Experiment Station.
- Muench, J. 1965. *Private Forests and Public Programs in North Carolina*. Raleigh, NC: North Carolina Forestry Association.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior : Butler (2008)



❧ **Ownership Objectives:** Vary by size of forest holding.

- McClay, T.A. 1961. Similarities among owners of small private forest properties in nine eastern localities. *J. For.* 59:88-92.
- Kingsley, N.P. 1976. *The Forest-Land Owners of Southern New England* (Resource Bulletin NE-41). Upper Darby, PA: USDA Forest Service, Northeastern Forest Experiment Station.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



❧ **Timber Management Objectives:** As size of forest holding increases, so does probability owner has timber management objectives

- Clawson, M. 1957. Economic size of forestry operations. *J. For.* 55:521-526.
- Row, C. 1978. Economies of tract size in timber growing. *J. For.* 76:576-579.
- Cabbage, F.W. 1983. *Economics of Forest Tract Size: Theory and Literature* (General Technical Report SO-41). New Orleans, LA: USDA Forest Service, Southern Forest Experiment Station.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



- ❧ **Absentee Ownership:** As size of forest holding increases, so does absentee ownership.
- Mullins, W.H. 1960. What about absentee ownership? *For. Farmer* 20:35-37.
  - Quinney, D.N. 1962. *Small Private Forest Landowners in Michigan's Upper Peninsula – Characteristics, Ownership Attitudes, and Forestry Practices* (Station Paper No. 95). St. Paul, MN: USDA Forest Service, Lake States Forest Experiment Station.
  - Noreen, P.A., and Hughes, J.M. 1968. *A Study of Absentee Owners of Pine County, Minnesota Forest Land* (Minnesota Forestry Research Notes No. 195). St. Paul, MN: School of Forestry, University of Minnesota.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



❧ **Leasing:** As size of forest holding increases, so does leasing by family forest owners.

- Southern, J.H., and Miller, R.L. 1956. *Ownership of Land in the Commercial Timber Area of Southeast Texas, 1955* (Progress Report 1853) College Station, TX: Texas Agricultural Experiment Station.
- Perry, J.D., and Guttenberg, S. 1959. *Southwest Arkansas' Small Woodland Owners* (Occasional Paper 170). New Orleans, LA: USDA Forest Service, Southern Forest Experiment Station.
- Toms, R.E., and Marlin, C.B. 1972. *Some Characteristics of Small Landowners in the Pine Region of Northwest Louisiana* (LSU Forestry Note No. 102) Baton Rouge, LA: Louisiana Agricultural Experiment Station

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



∞ **Participation:** As size of forest holding increases, so does participation in cost-share, easements, certification.

- Hutchison, O.K., and McCauley, O.D. 1961. *The Small Woodland Owner in Ohio* (Technical Paper 1830). Columbus, OH: USDA Forest Service, Central States Forest Experiment Station.
- Wheatcraft, A.M. 1982. *Public Assistance Programs for Nonindustrial Private Forestry: An Annotated Bibliography* (Paper No. 1818). St. Paul, MN: University of Minnesota Agricultural Experiment Station.
- Rickenbach, M.G. 2002. Forest certification of small ownerships: Some practical challenges. *J. For.* 100:43-47.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



- ❧ **Timber Harvesting:** As size of forest holding increases, so does commercial timber harvesting.
- ❧ Porterfield, R.L., and Moak, J.E. 1977. Timber management for nonindustrial forest owners: A matter of perspective. *South. J. Appl. For.* 1:2-6.
- ❧ Holmes, T., and Diamond, J. 1980. *An Analysis of Non-Industrial Private Woodland Owners' Attitudes towards Timber Harvesting and Forest Land Use Windham County, Connecticut, 1979* (Research Report 63). Storrs. CT: Storrs Agricultural Experiment Station.
- ❧ Cubbage, F.W. 1982. *Economies of Forest Tract Size in Southern Pine Harvesting* (Research Paper SO-184) New Orleans, LA: USDA Forest Service, Southern Forest Experiment Station.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



❧ **Management Plan:** As size of forest holding increases, so does percent of family forest owners with management plan.

- McMahon, R.O. 1964. *Private Nonindustrial Ownership of Forest Land* (Bulletin No. 68) New Haven, CT: Yale University School of Forestry.
- Marlin, C.B. 1978. *A Study of Small Owners of Small Timber Tracts in Louisiana* (Bulletin No. 710). Baton Rouge, LA: Louisiana Experiment Station.
- Eagan, A., Gibson, D., and Whipkey, R. 2001. Evaluating the effectiveness of the Forest Stewardship Program in West Virginia. *J. For.* 99:31-36.

# Primary Influences of Size of Forest Holding on Family Forest Management Behavior: Butler (2008)



- ❧ **Management Advice** : As size of forest holding increases, owner more likely to seek forest management advice.
- Kittredge, D.B. 2004. Extension/outreach implications for America's family forest owners. *J. For.* 102:15-18.
  - Butler, B.J., Tyrell, M., Feinberg, G. VanManen, S. Wiseman, L., and Wallinger, S. 2007. Understanding and reaching family forest owners: Lessons from social marketing research. *J. For.* 105:348-357.
  - Kilgore, M.A., Snyder, S.A., Schertz, J., and Taff, S.J. 2008. What does it take to get family forest owners to enroll in a forest stewardship-type program? *For. Pol. Econ.* 10:507-514.

# Parcelization



- ❧ Late in the twentieth century a new research issue arose in the NIPF literature and is now gaining importance as population increases and urban development take place in the U.S.
- ❧ Parcelization is the decrease in average NIPF tract size as owners sell or gift parcels from their holding or divide it among multiple heirs at their death. As urban centers expand, parcelization becomes most pronounced at the urban/rural interface.

# Parcelization



- Parcelization erodes the tract size distribution of family forests. Average tract size decreases over time, while number of family forest owners increase. Or, in the old jargon, forest holdings are divided into small holdings over time.
- Smaller tracts are more difficult to manage and timber harvests become more challenging (decreasing economics of scale). Also, related problems of fragmentation impact the landscape and local habitats.

# Parcelization



☞ Mehmood & Zhang (2001) identified contributing factors:

- Death
- Urbanization
- Rising income
- Regulatory uncertainty
- Financial assistance for landowners (cost-share)

# Parcelization



- As average tract size decreases, the economic implications become those already so well-discussed in the NIPF literature as the size of forest holding issues.
- Not only are the economies of scale inherent to the larger tract lost, but given the nearby development, the new owners may not hold timber production as an objective of their ownership.

# Parcelization



✧ The early NIPF literature referred to this issue as fragmentation (Schallau 1962,1965), but it should not be confused with the more current issue of forest fragmentation which refers to a disruption in the continuity of natural landscapes as NIPF land is divided among more owners or converted to more developed uses (YFF,2000).

# In the current literature:



- ❧ Haines, A.L.; Kennedy, T.T.; McFarlane, D.L. 2011. Parcelization: Forest change agent in Northern Wisconsin. *J. For.* 109: 101-108.
- ❧ Mehmood, S.R.; Zhang, D. 2001. Forest parcelization in the United States: A study of contributing factors. *J. For.* 99: 30-34.
- ❧ Sampson, N.; DeCoster, L. 2000. Forest fragmentation: Implications for sustainable forests. *J. For.* 98: 4-8.
- ❧ DeCoster, L.A. 1998. The boom in forest owners – A bust for forestry? *J. For* 96: 25-28.
- ❧ Moldenhauer, M.C.; Bolding, M.C. 2009. Parcelization of South Carolina's private forestland: Loggers reactions to a growing threat. *For. Prod. J.* 59: 37-43.
- ❧ Germain, R.H.; Anderson, N.; Berilacqua, E. 2007. The effects of forestland parcelization and ownership transfers on nonindustrial private forestland forest stocking in New York. *J. For.* 105: 403-408.

# Parcelization: Historical Roots

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- ❧ Size of forest holding with its deep NIPF/family forest history, is part of the parcelization problem that is so much of the current forestry literature. Much of this literature does not recognize the roots of the problem.
- ❧ Parcelization shows up in the NIPF literature in the 1960's in a series of NIPF studies in Michigan.

# Parcelization: The Michigan Studies

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- ❧ Schallau, C.H. 1962. *Small Forest Ownership in the Urban Fringe Area of Michigan*. Station Paper No. 103. USDA Forest Service, Lake States Forest Experiment Station
- ❧ Schallau, C.H. 1965. *Fragmentation, Absentee Ownership, and Turnover of Forest Land in Northern Lower Michigan*. Research Paper LS-17. USDA Forest Service, Lake States Forest Experiment Station.

# Parcelization: Schallau(1962)

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- ❧ He found that large ownerships had been divided and sold, prompting the question: “Are Michigan’s forest properties in general getting smaller?”
- ❧ Why be concerned. “Theoretically, reducing the average size of tract would decrease the economic supply of timber, other things remaining constant.”

# Parcelization



✧ Going back to the title of the two publications, we can see these studies are looking at fragmentation of forest properties at the urban fringe.

# Conclusions



- ❧ Today's research of NIPF and family forest research tends to neglect the foundation of research on the subject of parcelization that would fall under size of forest holding topic.
- ❧ Sampling the current literature that examined the influences Butler (2008) summarized reveals this.

# Conclusions



- ❧ **Land Tenure (Death Rate)** : “ As death rate increases, so does parcelization” .
- ❧ **Land Transfers** : Taxes (estate & inheritance taxes per acre of NIPF land). “ As tax rate increases, so does parcelization” .
- ❧ **Timber Harvesting, Ownership & Timber Management Objectives, Participation**: “NIPF owners are problem of poor management, low productivity, and unpredictable behavior” .

# Conclusions



- ❧ A firm foundation of the last 75 years of research that defined today's family forest focus is required to fully understand today's family forest policy issues.

# Questions?

